THE ATHENÆUM

Journal of English and Foreign Literature, Science, and the Fine Arts.

No. 719. LONDON, SATURDAY, AUGUST 7, 1841. PRICE FOURPENCE, (*Stamped Edition, 5d.*)

For the convenience of Subscribers in remote places, the weekly numbers are reissued in Monthly Parts, stitched in a wrapper, and forwarded with the Magazines.—Subscriptions for the Stamped Edition for the Continent, for not less than 3 Months, and in advance, are received by M. BAUDRY, 3, Quai Malaquais, Paris, or at the Athenæum Office, London. For France, and other Countries not requiring postage to be paid in London, 28 fr. or 11. 2s. the year. To other countries, the postage in addition. [JAMES HOLMES, TOOK'S COURT.]

KING'S COLLEGE, London.—DEPARTMENT of ENGINEERING, ARCHITECTURE, ARTS, and MANUFACTURES.—The CLASSES for the INSTRUCTION of STUDENTS in ARCHITECTURE will be RE-OPENED on Tuesday, the 5th of October.
MATHEMATICS..Prof. the Rev. T. G. Hall, M.A.
MECHANICS..Prof. the Rev. H. Moseley, M.A. F.R.S.
CHEMISTRY..Prof. Daniell, F.R.S.
EXPERIMENTAL PHILOSOPHY..Prof. Wheatstone, F.R.S.
GEOLOGY..Prof. Ansted, F.G.S.
PRINCIPLES and PRACTICE of ARCHITECTURE .. Prof. Hosking, F.S.A.
ARTS of DESIGN and ARCHITECTURAL ENRICHMENT.. Prof. Dyce, M.A. F.R.S.E., Director of the Government School of Design.
MACHINERY—Mr. E. Cowper.
GEOMETRICAL DRAWING..Mr. T. Bradley.
ARCHITECTURAL LANDSCAPE DRAWING and COLOURING..Mr. Cotman.
MINERALOGY..Mr. J. Tennant, F.G.S.
LAND SURVEYING and LEVELLING..Mr. H. J. Castle.
August, 1841. J. LONSDALE, Principal.

MANCHESTER NEW COLLEGE, IN CONNECTION WITH THE UNIVERSITY OF LONDON.
The SESSION of 1841-42 will commence on the 4th of October, being the first Monday in the month. The entrance examination of students who intend to pass through the full under-graduate course will take place on Friday the 1st of October.
In the LITERARY and SCIENTIFIC DEPARTMENT, Lectures will be delivered, in the coming Session, on the following subjects:—
I. Greek and Latin Languages; Grammatical Structure of the English Language, and Composition of English.—By F. W. Newman, Esq. B.A. late Fellow of Balliol College, Oxford.
II. Pure and Mixed Mathematics.—By R. Finlay, Esq. B.A. Trinity College, Dublin.
III. Ancient and Modern History.—By Rev. John Kenrick, M.A.
IV. Mental Philosophy and Logic.—By Rev. Jas. Martineau.
V. Physical Science and Natural History.—By Montague L. Phillips, Esq.
VI. Civil Engineering.—By a Professor shortly to be appointed, in conjunction with the Professors of Mathematics and Physical Science.
VII. French Language and Literature.—By F. E. Vembergue, Esq.
The yearly fee for the entire course is 25*l*. Students wishing to attend separate classes only, may get a printed statement of the studies and fees in detail at the College, from the Secretaries —the Rev. WM. GASKELL, Dover-street, Chorlton-upon-Medlock; and SAMUEL D. DARBISHIRE, Esq. Marsden-street, Manchester; from the following Booksellers, viz.: Forrest, Market-street; Simms & Dinham, Exchange-street; G. Hamilton, King-street; or by letter addressed to the Secretaries at the College.
Students desiring information on the means of getting board and lodging, may learn particulars from the Secretaries.
Grosvenor-square, Chorlton-upon-Medlock,
July 26, 1841.

GOVERNMENT SCHOOL OF DESIGN,
Somerset House, July 21, 1841.
NOTICE is hereby given, that the Probationary Class open to Competitors for the six Exhibitions of 20*l*. a year each, founded for the Instruction of Teachers in Branch Schools of Design, will not be commenced before the 1st of November next, and that the time for the delivery of testimonials, &c. has been *postponed* to the 14th October. Persons desirous of learning the conditions to be complied with by Candidates, are requested to apply to me either by letter, or personally between the hours of 12 and 3. W. DYCE, Director.

CLASSICAL TUTOR IN FRANCE.
A MEMBER of the UNIVERSITY of OXFORD, who is about to pass twelve months in Touraine, one of the most delightful provinces of France, wishes to take with him TWO or THREE PUPILS, whose classical and general studies he would superintend, and at the same time pay the strictest attention to their moral discipline. Very great facilities can be offered for the speedy acquirement of the French language. The highest testimonials can be given. Address E. H., at Mr. Rowe's, Bookseller, Whimple-street, Plymouth.

GOVERNESS INSTITUTION, 30, SOHO-SQUARE.—MRS. HINTON, who has resided many years on the Continent, and is conversant in French, German, and Italian, respectfully informs the Nobility, Gentry, and Principals of Schools, that her List contains the Names of highly-respectable English and Foreign Governesses, resident, daily, or occasional, properly qualified to take every branch of a finished education.—Also, Masters for Languages, Music, Dancing, &c. Schools transferred and recommended in England, France, Belgium, Germany, and Switzerland. Letters must be free.

SCHOOL for DRAWING and PAINTING, No. 6, CHARLOTTE-STREET, BLOOMSBURY, LONDON.—This School has been many years established for the education of artists and the instruction of amateurs in drawing, painting, modelling, &c.; and possesses the most complete arrangements as a Probationary School to the Royal Academy. The gallery and studi are at all times open for inspection, and contain an extensive collection of casts from the antique; also, drawings and paintings. In the library are books on art, and folios of prints from the works of the old masters. There is a separate establishment for ladies, and private studi for those who may desire them.—Prospectus may be obtained at the above address.—A VACANCY for a Pupil in the house.

ELECTROTYPE.—J. PAYNE, ENGRAVER, 22, Fleet-street, nearly opposite Chancery-lane, has brought out a new form of Electrotype Apparatus, price 12*s*., for copying Medals, Antique Gems, Letter Seals, &c. It will copy twelve or more at one time, by merely immersing the subject to be copied in the liquid, without the present objection of fingering the solutions used. Ladies can now practise this useful and entertaining process without soiling their hands. The Apparatus may be seen in action, and the required instructions given to the purchaser. It is acknowledged (by those conversant with this modern discovery) to be the most compact and economical apparatus yet in use.
Country friends can have them forwarded; also the prepared Moulds, Wax Impressions, Plaster Casts, &c.

STUDENTS in GEOLOGY, MINERALOGY, or CONCHOLOGY, can be supplied with an extensive assortment of Specimens to illustrate these interesting branches of Science, or with Elementary Collections, carefully arranged and described, at 2, 5, 10, 20, to 50 Guineas each, by J. TENNANT, Mineralogist to Her Majesty, 149, Strand, London.—J. Tennant has Geological Maps, Hammers, Casts of scarce Fossils, and some new Geological Models in Wood, invented by T. Sopwith, Esq. F.G.S., to illustrate the nature of Stratification, Faults, Veins, &c., sold in sets, from 2*l*. to 5*l*. each, accompanied with letter-press descriptions; the latter can be had separate, price 3*s*.

Sales by Auction.

SOUTHGATE'S ROOMS.

By Messrs. SOUTHGATE & SON, at their Rooms, 22, Fleet-street, THIS DAY, August 7, at 1 o'clock precisely,
AN EXTENSIVE COLLECTION of MODERN BOOKS, in Quires and Boards. May be viewed and Catalogues had.
And in a few days,
A LARGE and very VALUABLE COLLECTION of COPPERPLATES, after celebrated Ancient and Modern Masters, engraved by the most esteemed Artists.
Also, a MISCELLANEOUS COLLECTION of BOOKS, including the Law Library of a Barrister, removed from the country. Together with about 200 dozen of CHOICE WINES.
Messrs. S. & SON respectfully announce that they have received instructions from the Assignees of Messrs. BANCKES & CO. Booksellers, to SELL BY AUCTION their extensive STOCK IN TRADE, comprising large quantities of Modern Publications, and Valuable Works in all Branches of Literature. Catalogues will be forwarded to Country Booksellers on application to Messrs. S. & Son, at their Offices, No. 22, Fleet-street.
*** Liberal accommodation offered on Property; and large or small Collections of Books, Prints, &c., promptly disposed of by Public Competition.

THE ADELAIDE GALLERY FOR SALE, IN ONE LOT.
MESSRS. FOSTER & SON have the honour to announce to the Scientific World they are directed by the Managers of the Society for the Illustration and Encouragement of Practical Science, to SELL BY AUCTION, at the Mart, on WEDNESDAY, August 11, at 12, in One Lot, the highly interesting, rare, and valuable OBJECTS of NATURE and ART at the Adelaide Gallery. Half a million of visitors have experienced the pleasure of inspecting this celebrated Exhibition; and the Managers, animated with the hope the public may still reap the benefit of their hearty endeavours to carry out the objects for which the Institution was founded, and on which the Proprietary have expended more than 20,000*l*., have resolved to submit all their property at the Gallery and all the fittings in one lot. A few only of the more interesting objects can be here enumerated:—Perkins's steam gun, the electrical eel, Sharp and Roberts's power loom, Perkins's celebrated machine for showing the compression of water, a high-pressure steam-engine of three-horse power, several working models of steam and other engines, powerful air-pump, Galloway's rotary railway in operation, Pritchard's great achromatic compound microscope, a bi-scenascope, Troughton and Sims's standard barometer, a variety of philosophical, electrical, chemical, optical, pneumatic, hydraulic, and fantastic machines, engines, and apparatus, cosmoramas, dissolving views, magnets, Chinese fireworks, an organ by Flight, and a vast variety of items curious and valuable; also all the fittings, fixtures, and effects belonging to the proprietary.—To be viewed ten days prior, by Catalogues only, which may be had (at 6*d*. each) of the Secretary, at the Gallery; and of Messrs. Foster & Son, 14, Greek-street, and 54, Pall Mall. Particulars also of Messrs. J. C. & H. Freshfield, Solicitors to the Institution, Bank-buildings.

BOOKS IN QUIRES, ILLUSTRATED WORKS, ETC.
MR. L. A. LEWIS will SELL BY AUCTION, at his House, 125, Fleet-street, on THURSDAY, 12th, and two following days, a VALUABLE COLLECTION of BOOKS, ILLUSTRATED WORKS, &c., including Parkinson's Organic Remains of a former World, 3 vols.—Loudon's Magazine of Natural History, 9 vols.—Loudon's Gardener's Magazine, 10 vols. —Loudon's Cottage Architecture—Sporting, by Nimrod, India proofs—Perry's Conchology, plates coloured—Lodge's Portraits of Illustrious Personages, 4 vols. folio edition, Encyclopædia Edinensis, 6 vols.—Sir Walter Scott's Waverley Novels, Prose and Poetical Works, and Life, 98 vols. morocco—European Scenery, 7 vols. morocco—Lane's Arabian Nights, 3 vols.—Ancient Egyptians, by Wilkinson, 3 vols.—Campbell's Poets—Byron's Works—Swift's Works—Fielding's Works—128 Copies of Roubouse's Journey through Albania and Greece, 2 vols. with the Copperplates—334 Copies of Woodward's Eccentric Excursion, with the 100 Copperplates; and numerous other Books in quires, &c. &c.
Plate and Plated Articles, some Jewels, &c. part the Property of the late Hon. General BLIGH, and part the Property of a Gentleman, deceased, and removed from his late Residence in Pall Mall.—By Mr. RAINY, at the Gallery, No. 14, on the East Side of Regent-street, on TUESDAY, August 17, at 12 for 1 precisely,
TWO THOUSAND OUNCES of PLATE, including Soup and Sauce Tureens, Corner Dishes, Candlesticks, Forks, Spoons, Tea-kettle and Tea-service, Plated Icepails and Waiters, valuable brilliant Head and other Ornaments, Pins, Bracelets, Ear-rings, a few Trinkets, &c. To be viewed on Monday preceding, and Catalogues had at the Gallery.

Ornamental and other Porcelain, Alabaster Ornaments, Clocks, Bronzes, elaborate Carvings, a beautiful Painted Glass Window, two splendid Ebony Armoires, Guns and Pistols by Manton, and Miscellanies, part the Property of the late Hon. General BLIGH.—By Mr. RAINY, at the Gallery, No. 14, on the East Side of Regent-street, on WEDNESDAY, August 18, at 12 for 1 precisely,
ORNAMENTAL and other PORCELAIN, some Dinner and Dessert Services, Oriental Jars and Beakers, French and other Clocks, Bronzes, Ornaments in Alabaster, two superb Ebony Armoires, two Ebony Sideboards, a beautiful Painted Glass Window, capital Guns and Pistols by Manton, some curious and very elaborate Carvings, a Double-action Harp by Erard, and Miscellanies.—To be viewed on Saturday and Monday preceding, and Catalogues had at the Gallery.

The Library of Books of the late Hon. General BLIGH, of the late Hon. Col. STOPFORD, and of a Gentleman, deceased, and removed from his late Residence in Pall Mall.—By Mr. RAINY, at the Gallery, No. 14, on the East Side of Regent-street, on THURSDAY, August 19, and following day, at 12 for 1 precisely,
THE LIBRARIES comprise Rees's Cyclopædia —Coxe's Historical Works—Boydell's Shakspeare—Bayley and Mant's Bible—Milton, by Newton—Bruce's and Clarke's Travels—Grose's Antiquities—Grammont's Memoirs—The London Gazettes—Lord Oxford's Works—Annual Register—The Works of Buffon, Voltaire, Robertson, and Hume—Quarterly, Edinburgh, and Blackwood's Reviews, &c.—To be viewed on Friday and Saturday, the 13th and 14th, and on Monday, the 16th of August, and Catalogues had at the Gallery.

Collection of Pictures, the Property of a Gentleman deceased, and removed from his late Residence in Pall Mall.—By Mr. RAINY, at the Gallery, No. 14, on the East Side of Regent-street, on SATURDAY, August 21, at 12 for 1 precisely,
THE Valuable COLLECTION of PICTURES, including a charming Landscape by Hobbema, in his best manner—A View of Dort, with Boats and Figures, by Cuyp—A Mountainous Landscape, by ditto—Portrait of his late Majesty George IV. when Prince of Wales, whole-length, by Hoppner—Nell Gwynne, whole-length, by Sir P. Lely; and the Works of

Vandervelde	Ruysdael	Seb. Ricci
Vanderwerf	Canaletti	F. Hablo
G. Dow	Horozonti	Pether, &c.

To be viewed on Friday and Saturday, the 13th and 14th, and on Monday, the 16th of August, and Catalogues had at the Gallery.

MONTHLY CATALOGUES OF OLD BOOKS.
Now ready,
THE SHEET CATALOGUE for the Present Month, containing many valuable and curious Articles now offered for SALE by JOHN BRYANT, the Camden Head, 9, King William-street, West Strand, London.
Parties desirous of having the Catalogues forwarded, on the day of publication, are requested to hand their addresses, when they will be sent *postage free*.

Just published, at 4 and 5, York-street, Covent-garden,
HENRY G. BOHN'S GUINEA CATALOGUE of BOOKS, in one remarkably thick volume 8vo. extending to 2,100 pages, half-bound red morocco, with flexible back. It comprehends above *three hundred thousand* volumes, in every department of Literature and the Fine Arts, and in most Languages, and is the largest assortment ever offered for sale by a Bookseller. Moderate prices are affixed to all the fine and curious books, and reduced prices to most of the modern publications; and upwards of five thousand bibliographical notices are interspersed. There are few books of importance, old or new, English or foreign, but what may be procured from the Advertiser, whose stock is daily increasing.
The Catalogue will be allowed to gentlemen making purchases to the extent of 20*l*., or it will be refunded on return of the Catalogue within six months.
PUBLIC LIBRARIES and Literary Institutions in all parts of the world may obtain the Catalogue *gratis*, on applying for it by post, with instructions how to send it.
As there are several firms similar in name, please to observe the address, and to prevent mistakes, order
HENRY G. BOHN'S GUINEA CATALOGUE,
4 AND 5, YORK-STREET, COVENT-GARDEN.

THE ASIATIC JOURNAL for AUGUST is now ready, and may be procured, by order, from any Bookseller, in Town or Country: it contains the latest intelligence from India brought by the OVERLAND MAIL, JUST ARRIVED—Original amusing Articles on India—and a full Account of the Debates at the East India House relative to the Rajah of Sattara.
London: Wm. H. Allen & Co. 7, Leadenhall-street.

This day is published, price 6*d*. sewed, No. VI. of the MICROSCOPIC JOURNAL, edited by DANIEL COOPER, A.L.S. &c.
Contents: Dr. Vogt on the Animalcules of the Red Snow—Dr. Ehrenberg on the Organic Composition of Chalk and Chalk Marl—Memoir of the late Francis Bauer, Esq.—Extracts and Abstracts from Foreign Journals—Microscopic Memoranda, &c. Nos. I. to VI. forming Part I. and II., price 1*s*. 6*d*. each, sewed, are now ready.
John Van Voorst, 3, Paternoster-row; and all Booksellers and Opticians.

Lately published, in 3 vols. 8vo. price 1*l*. 11*s*. 6*d*. cloth,
A HISTORY of the REFORMATION on the CONTINENT. By GEORGE WADDINGTON, D.D. Dean of Durham, Author of a 'History of the Church.'
"The author has collected and examined documents and facts not generally known; he has weighed and dissertated upon them with exemplary calmness and impartiality, such, indeed, as seldom characterize historians who take the Reformation for their theme."—*Monthly Review.*
London: Duncan & Malcolm, 37, Paternoster-row.

Now publishing, in Monthly Parts, at 1*s*. each, a New Work for the Use of Schools, Governesses, and Families,
CORNER'S HISTORICAL LIBRARY: forming a cheap, accurate, and beautifully-illustrated History of every Country in Europe, brought down to the Present Time.
On the 2nd of August will be published, price 1*s*., embellished with a beautiful Engraving on Steel,
PART XIX. of this Popular and interesting Work, completing the History of Turkey and the Ottoman Empire, including that of Egypt and the Holy Land, by MISS CORNER. The History of Turkey is complete in Three Parts, at 1*s*. each; or bound, at 3*s*. 6*d*.
Of the previous Eighteen Parts of this Publication, Three are devoted to the History of England, Two to that of Ireland, Two to Scotland, Two to France, Two to Spain and Portugal, Two to Denmark, Sweden, and Norway, Three to Germany and the German Empire, and Three to Turkey and the Ottoman Empire. Any of which Parts may be had, together or separate, at 1*s*. each; and bound strongly in cloth for 6*d*. each country, extra.
*** POLAND and RUSSIA will be next ready.
London: Dean & Munday; and Simpkin, Marshall & Co.; and all Booksellers in the United Kingdom.

UNION BANK of AUSTRALIA, London Office, 38, Old Broad-street.

Directors.

George Fife Angas, Esq. | Benjamin E. Lindo, Esq.
Robert Brooks, Esq. | Chas. Edward Mangles, Esq.
John William Buckle, Esq. | Christ. Rawson, Esq. Halifax
James John Cummins, Esq. | Thos. Sands, Esq. Liverpool
Robt. Gardner, Esq. Manchester | James Bogle Smith, Esq.
John Gore, Esq. | James Ruddell Todd, Esq.

Trustees.

George Carr Glynn, Esq. | John Gore, Esq.
James John Cummins, Esq.

Bankers—Messrs. Glyn, Halifax, Mills & Co.
Solicitors—Messrs. Bartlett & Beddome.
Secretary—Samuel Jackson, Esq.
Colonial Inspector—John Cunningham Maclaren, Esq.

The Directors of this Bank GRANT LETTERS of CREDIT, which are not transferable, or Bills at thirty days' sight on their Branches at

SYDNEY | LAUNCESTON
BATHURST | CAMPBELL TOWN; and
HOBART TOWN | MELBOURNE, PORT PHILIP.

And also negotiate approved Bills on the Colonies at thirty, sixty, and ninety days' sight, the terms for which may be obtained at their Office. Bills at thirty days' sight and Letters of Credit on New Zealand at par.

Bills on the Australian Colonies transmitted for collection at the usual charge.

By order of the Board,
SAMUEL JACKSON, Secretary.

LONDON, EDINBURGH, and DUBLIN GUARANTEED MUTUAL and PROPRIETARY LIFE ASSURANCE COMPANY, 3, Charlotte-row, Mansion House, and 19, Regent-street, London; 21, St. Andrew-street, Edinburgh; Fleet-street, Dublin.

Directors—Alex. Anderson, Esq. | Kennett Kingsford, Esq.
John Atkins, Esq. | John M'Guffie, Esq.
James Bidden, Esq. | John Maclean Lee, Esq.
Captain F. Brandreth. | J. Marmaduke Rosseter, Esq.
Vice-Admiral Robt. Honyman | Alexander Robertson, Esq.
Benjamin Hill, Esq. | Managing Director.
John Johnson, Esq. Alderman

Solicitors—Messrs. Palmer, France & Palmer.
Secretary—F. Edgell, Esq.

Important improvements have been introduced into Life Assurance practice by this Company.

THE POLICIES ARE INDEFEASIBLE AND INDISPUTABLE, unless they have been obtained by fraudulent misrepresentation. The Board of Directors satisfy themselves upon the various questions proposed before they enter into contracts of assurance, and frame their policies in such terms as to preclude all future questions as to their validity, and thus render them indisputable and negotiable documents of future debt against the Company. Parties may be assured either upon the participating or non-participating plan; the assured are relieved of all responsibility, and the participating class is entitled to the whole of the profits upon that branch of the business.

Table to assure 100*l.* with addition of profits.

Age 25	Age 35	Age 40	Age 45	Age 50	Age 55
£2 2 7	£2 15 10	£3 5 0	£3 15 5	£4 10 7	£5 13 8

Persons interested in the lives of nominees or debtors may for a trifling extra premium be relieved from the perils of their policies being forfeited by the parties going to foreign countries.

One-half of the premiums may remain unpaid for seven years, affording a greater facility for loan transactions and family provisions than any other plan which has been suggested.

Credit Table to assure 100*l.* payable at death.

Age 20	Age 25	Age 30	Age 40	Age 45	Age 50
£0 18 0	£1 0 7	£1 3 7	£1 11 5	£1 16 6	£2 3 9

The usual commission allowed to solicitors and agents, and medical gentlemen are in all cases remunerated for their reports.

Published by J. Churchill, Princes-street; Sherwood & Co. Paternoster-row; and S. Highley, Fleet-street.

PHARMACEUTICAL TRANSACTIONS.
Edited by JACOB BELL.
Numbers 1 and 2. Price 8*d.* each Number.

This day, with 78 Engravings, 2 vols. 8vo. 32*s.*

INCIDENTS of TRAVEL in CENTRAL AMERICA, CHIAPAS, and YUCATAN.
By JOHN L. STEPHENS, Author of 'Incidents of Travel in Egypt, Arabia Petræa, and the Holy Land,' &c.
John Murray, Albemarle-street.

Now ready, Second Edition, revised, 3 vols. 8vo. 35*s.*

HISTORY of the POPES of ROME, during the XVIth and XVIIth Centuries.
Translated from the German of LEOPOLD RANKE.
By SARAH AUSTIN.
John Murray, Albemarle-street.

This day is published, in post 8vo. cloth lettered, price 5*s.* 6*d.*

MEDICAL ADVICE to the INDIAN STRANGER.
By JOHN M'COSH, M.D.
London: Wm. H. Allen & Co. 7, Leadenhall-street.

This day is published,

A CODE of SIGNALS for the Use of the Mercantile Navy.
By B. J. WALKER, Lieut. R.N.
2 vols. royal 8vo. cloth lettered, price 18*s.*
London: Wm. H. Allen & Co. 7, Leadenhall-street.

This day is published, in 8vo. price 2*s.* 6*d.* Part IV. of

THE HISTORY of the BRITISH EMPIRE in INDIA.
By EDWARD THORNTON, Esq.
Author of 'India, its State and Prospects,' &c.
This work, prepared from the most authentic sources of information, will be completed in about Twenty Monthly Parts.
London: Wm. H. Allen & Co. 7, Leadenhall-street.

In post 8vo. price 6*s.* illustrated with upwards of 60 Woodcuts.

THE FRUIT, FLOWER, and KITCHEN GARDEN.
By PATRICK NEILL, L.L.D. F.R.S.E.,
Secretary to the Caledonian Horticultural Society,
"One of the best modern books on Gardening extant."—*London's Gardeners' Magazine.*
Adam & Charles Black, Edinburgh; Longman & Co.; Simpkin, Marshall & Co.; Whittaker & Co.; and Hamilton, Adams & Co. London.

Just published, in 12mo. price 7*s.* 6*d.* in boards,

SERMONS PREACHED in the PARISH CHURCH of ST. MARY-DE-CRYPT, GLOUCESTER.
By the late Rev. JOHN GOULTER DOWLING, M.A.
Of Wadham College, Oxford, and Rector of that Parish.
Rivingtons, St. Paul's Churchyard, and Waterloo-place.
Of whom may be had, by the same Author,

1. An Introduction to the Critical Study of Ecclesiastical History, attempted in an Account of the Progress, and a Short Notice of the Sources, of the History of the Church. 8vo. 9*s.*

2. The Effects of Literature upon the Moral Character, a Lecture delivered at the Tolsey, Gloucester, Sept. 1809. 18mo. 2*s.*

SIR WALTER SCOTT'S HISTORY OF SCOTLAND—SCHOOL EDITION.
In 2 thick vols., bound together or separately,

THE HISTORY of SCOTLAND, from the Earliest Period to the close of the Rebellion 1745-46,—contained in TALES of a GRANDFATHER, by SIR WALTER SCOTT, Bart.
Robert Cadell, Edinburgh; Houlston & Stoneman, London.

In 8vo. price 9*s.*

ELEMENTS of ALGEBRA.
By the Rev. P. KELLAND, A.M. F.R.S.S. L. & E., &c. &c., late Fellow of Queen's College, Cambridge, Professor of Mathematics, &c. in the University of Edinburgh.
Adam & Charles Black, Edinburgh; Longman & Co. London.

BUTLER'S OUTLINE MAPS.

GEOGRAPHICAL and BIOGRAPHICAL EXERCISES; with a set of coloured Outline Maps, designed for the Use of Young Persons. By the late WILLIAM BUTLER, and enlarged by the late JOHN OLDING BUTLER. 23rd edition, carefully revised.
John Harris, corner of St. Paul's Churchyard.

Price 3*s.* 6*d.* handsomely bound (post free, 1*s.* extra), 270 pages,

THE VISITOR'S GUIDE to the WATERING PLACES, for 1841, describing every object of interest and attraction, viz.: Baths, Balls, Concerts, Theatres, Races, Drives, Rides, Walks, Exhibitions, Raffling, Music, Excursions, Sights, &c. at Gravesend, Tunbridge Wells, Herne Bay, Ramsgate, Margate, Dover, Brighton, Hastings, Worthing, St. Leonard's, Cheltenham, Southampton, Isle of Wight, &c.
London: W. Strange, 21, Paternoster-row; and all Booksellers.

Price 2*s.* 6*d.* (post-free, 1*s.* extra), in 300 pages! the

"VISITOR'S GUIDE to the SIGHTS of LONDON," containing every object of interest and attraction at Greenwich Hospital, Woolwich Arsenal, Tower of London, St. Paul's Cathedral, British Museum, National Gallery, Westminster Abbey, Hampton Court Palace, Windsor Castle, and One Hundred other Exhibitions, most of them open to the public gratis!
London: W. Strange, 21, Paternoster-row; and all Booksellers.

Lately published, in 8vo. price 5*s.* 6*d.* in cloth boards,

PRACTICAL INTRODUCTION to GREEK ACCIDENCE.
By THOMAS KERCHEVER ARNOLD, M.A.
Rector of Lyndon, and late Fellow of Trinity Coll., Cambridge.
Rivingtons, St. Paul's Churchyard, and Waterloo-place.
Also, by the same Author,

1. Practical Introduction to Greek Prose Composition. 3rd edition, 8vo. 5*s.* 6*d.* And,

2. Practical Introduction to Latin Prose Composition. 3rd edition, 8vo. 6*s.* 6*d.*

Just published, in 12mo. price 4*s.* in cloth boards,

A SECOND LATIN BOOK, and PRACTICAL GRAMMAR; intended as a Sequel to HENRY'S FIRST LATIN BOOK.
By the Rev. THOS. KERCHEVER ARNOLD, M.A.
Rector of Lyndon, and late Fellow of Trinity Coll. Cambridge.
Rivingtons, St. Paul's Churchyard, and Waterloo-place.
Lately published, by the same Author,

1. Henry's First Latin Book. 2nd edit. 12mo. 3*s.*
2. A First Latin Verse Book. 12mo. 2*s.*

Published by the Stationers' Company,

TABLES REQUISITE to the USE of NAUTICAL MEN, ASTRONOMERS, and others; to which is prefixed an Introduction explanatory of their use, with improved Methods and Rules for determining the Latitude and Longitude at Sea, and for resolving the most useful Problems in Nautical Astronomy.
By OLINTHUS GREGORY, L.L.D. F.R.A.S.; W. S. B. WOOLHOUSE, Esq. F.R.A.S.; and JAMES HANN, Esq., of King's College.
London: sold by George Greenhill, at the Hall of the Company of Stationers, Ludgate-street.

Just ready, in 2 vols. small 8vo. with Illustrations,

A RUN THROUGH the UNITED STATES, DURING THE AUTUMN OF 1840.
By Lieut.-Col. A. M. MAXWELL, K.H.

II.

EXCURSIONS IN NORMANDY, illustrative of the State of Society, the Scenery, &c. of that interesting Province of France. Edited by FREDERIC SHOBERL, Esq. Author of 'The World in Miniature,' Editor of 'The Forget Me Not,' &c. 2 vols. small 8vo.

Also, just published,

TOM BOWLING, A TALE OF THE SEA. By Capt. FREDERIC CHAMIER, R.N. Author of 'Ben Brace,' 'The Life of a Sailor,' &c. 3 vols.
Henry Colburn, Publisher, 13, Great Marlborough-street.

Lately published, in one thick volume 8vo. 25*s.* cloth,

A LEXICON, HEBREW, CHALDEE, and ENGLISH, compiled from the most approved sources, Oriental and European, Jewish and Christian; with an English Index alphabetically arranged, forming a reversed Dictionary, English, Hebrew, and Chaldee.
By Professor LEE, D.D.
Regius Professor of Hebrew in the University of Cambridge, Prebendary of Bristol, Rector of Bartley, Herts, &c.
Also, by the same Author, a Third Edition, enriched with much original matter, price 12*s.* cloth, of

A Grammar of the Hebrew Language; comprised in a Series of Lectures, compiled from the best authorities, and principally from Oriental sources; designed for the use of Students in the Universities.
London: Duncan & Malcolm, Paternoster-row.

SHAKESPEARE SOCIETY.

LUDUS COVENTRIÆ; a COLLECTION of MYSTERIES, formerly represented at COVENTRY on the Feast of Corpus Christi.
Edited by JAMES ORCHARD HALLIWELL, Esq., F.R.S., Hon. M.R.I.A., F.S.A., F.R.S.A., &c.
Printed for the Shakespeare Society.
Members who have paid their Annual Subscription of 1*l.* can receive the above from Mr. Rodd, 2, Great Newport-street, Long Acre, and will also be entitled to the following Works recently issued by the Society:—

Memoirs of Edward Alleyn, Founder of Dulwich College; with new Information respecting Shakespeare, &c. By J. Payne Collier, Esq., F.S.A.

The School of Abuse. By Stephen Gosson.

The Apology for Actors. By Thomas Heywood.

The two last, with separate Introductions, are bound in the same volume.

*** By a Law of the Society no Member can obtain the Works issued by it until the Subscription is paid.

COMPLETE ENCYCLOPÆDIA OF SPORTING.
In 8vo. illustrated with nearly 600 beautifully executed Engravings on Wood, 50*s.* cloth lettered,

AN ENCYCLOPÆDIA of RURAL SPORTS.
By D. P. BLAINE, Esq.
"This book is a perfect library for all lovers of country sports, for all country gentlemen, and for all persons who delight in the manly and healthy recreations which are afforded to the inhabitants of no country in such perfection as to the inhabitants of the British Isles."—*Times.*
London: Longman, Brown & Co.

Just published, price 8*s.* bound,

GRADUS AD PARNASSUM.
A New Edition, thoroughly revised and corrected, with the Addition of many New Words, and with the English Meanings now first introduced.
London: printed for the Company of Stationers, and sold by G. Greenhill, Treasurer to the Company, at their Hall, Stationers'-court.
*** For the considerable changes introduced into this Edition of the Gradus, the Editor has availed himself of the suggestions of several of the most distinguished scholars in the kingdom; he trusts, therefore, that his labours will receive their approbation, as well as the sanction of the masters of grammar schools in general.

Now ready, 2nd edition, revised and much enlarged, and illustrated by highly-finished Woodcuts, 8vo. 9*s.* 6*d.*

THE MOOR and the LOCH, containing Practical Hints on Highland Sports, and Notices of the Habits of the different creatures of Game and Prey in the Mountainous Districts of Scotland, with instructions in Loch-Fishing; and to which is added Deer-Stalking, Hawking, Beaver and River Fishing. By JOHN COLQUHOUN, Esq.
"The whole composition is unpretending, clear, and practical, and does honour to the 'Parent Lake.' We leave Mr. Colquhoun for the present, with regret, for his Moor is, if anything, even better than his Loch."—*Quarterly Review.*
"The Moor and the Loch is the book of the season, of its class; more sound advice, a greater number of prime points of practice upon the subject treated of, we do not believe exists in any similar quantity of printed matter."—*Sporting Review.*
John Murray, Albemarle-street.

BOTANY, GEOLOGY, ORNITHOLOGY, AND CHEMISTRY.
In small 8vo. with Woodcuts and Plates, price 4*s.* 6*d.* each,

MANUALS OF NATURAL HISTORY,
By Professor Macgillivray, Marischal College, Aberdeen.

A MANUAL of BOTANY: comprising Vegetable Anatomy and Physiology; or, an account of the Structure and Functions of Plants; with an outline of the Linnæan and Natural Systems, and a Glossary of Terms and Index. Woodcuts and 214 engraved Figures.

2. A Manual of Geology, with Woodcuts and coloured Geological Map of England.

3. A Manual of British Ornithology: being a short description of the Birds of Great Britain and Ireland, including the essential characters of the species, genera, families, and orders. Part I. containing the Land Birds, with an Introduction explanatory of the particulars requisite to compare the objects with their descriptive characters; and 31 Woodcuts.

4. A Manual of British Ornithology: Part II, containing the Waders and Water Birds. *In the press.*
"The author has executed his undertaking with great care. His style is clear and full: there is nothing omitted which can be considered essential to the subject; and the whole series may be commended as admirable text-books for students."—*Atlas.*
Lately published, with 75 Woodcuts, price 4*s.* 6*d.*

A Manual of Chemistry, with Glossary and Index.
By Richard D. Hoblyn, M.A., Author of a Dictionary of Terms used in Medicine.
"This is an excellent compendium—to the student it recommends itself by the conciseness and clearness of its explanations, and by the useful introduction which it affords to works of more recondite research—it equally deserves our commendation as an important guide to general education. An important feature in this Manual, and one calculated to be of great benefit to the student, is the introduction at the end of each chapter of a series of questions upon the principal points discussed in each division."—*Lancet.*
London: Scott, Webster & Geary, Charterhouse-square.

NEW PUBLICATIONS.

I.

THE ANCIENT RÉGIME: a Tale.
By G. P. R. JAMES, Esq. 3 vols. crown 8vo. 31*s.* 6*d.*
"A story of great interest."—*Observer.*

II.

MUSIC and MANNERS of FRANCE and GERMANY. By H. F. CHORLEY, Esq. 3 vols. 31*s.* 6*d.*

III.

JOSEPH RUSHBROOK; or, the Poacher.
By CAPTAIN MARRYAT. 3 vols. price 31*s.* 6*d.*

IV.

JAS. MONTGOMERY'S POETICAL WORKS.
New and Complete Edition, edited by the AUTHOR: with Biographical Prefaces, and Additional Poems. In 4 vols. fcp. with Illustrations from G. Jones, Esq. R.A. price 20*s.* cloth.

V.

THOMAS MOORE'S POETICAL WORKS.
The Tenth and Concluding Volume of the New Edition: with Illustrations, fcp. 8vo. price 5*s.* cloth.—*On Tuesday next.*

VI.

ENGINES of WAR; or, Historical and Experimental Observations on Ancient and Modern Warlike Machines and Implements, &c. &c. By HENRY WILKINSON, M.R.A.S. &c. 8vo. price 9*s.* cloth.

VII.

DR. TURTON'S MANUAL of the LAND and FRESH-WATER SHELLS of the BRITISH ISLANDS. New edition, revised and augmented. By JOHN EDWARD GRAY, Esq. F.R.S. Post 8vo. with Woodcuts and 12 coloured Plates, price 15*s.* cloth lettered.

VIII.

HOARE on the GRAPE VINE. 3rd edition, with Additions, 8vo. price 7*s.* 6*d.*

IX.

A CATALOGUE of BOOKS in all branches of SCHOOL LITERATURE.
*** This Catalogue will be sent, gratis, to any given address.
London: Longman, Brown & Co.

LONDON, SATURDAY, AUGUST 7, 1841.

REVIEWS

The Itinerary of Rabbi Benjamin, of Tudela. Translated and edited by A. Asher. London and Berlin, A. Asher & Co. 1841.

Recueil de Voyages et de Mémoires publiés par la Société de Géographie. Tome 4. Paris, Arthus-Bertrand; London, Dulau. 1839.

THE two works, of which the titles are here prefixed, form a rich accession to the subsidiary information relating to an obscure period of history. If we were to say that they relate to the geography of the Middle Ages, we fear that our desire to express adequately our sense of their importance might be marred by the usually narrow acceptation of the term Geography. It is manifest that the narratives of travels written in the twelfth and thirteenth centuries must throw some light on the state of society in those ages, even if they add nothing to our knowledge of events. But in reality, the Papal missions into Tatary, in the thirteenth century, may themselves be justly ranked among the most remarkable historical facts, although historians do not seem to have hitherto discerned or acknowledged their entire significance. The itineraries and geographical narratives of the Middle Ages require, for the display of their value, but a small portion of that critical industry which is so lavishly bestowed on the writings of the ancients. Those early monuments of the literature of modern Europe, when freed from the corruptions of transcribers, and with the occasional errors of their authors explained or illustrated by a reference to the prevalent opinions of their age, will be found to be well deserving of an attentive study. M. Asher enters on his editorial labours with the most hopeful zeal and alacrity. He offers the following explanation of his views:—

"Every student must have felt with myself the entire want of a work on the Geography of the Middle Ages. Whilst on one hand Herodotus, Strabo, and the other *ancient* geographers have found editors and annotators without number, and on the other, not only individuals, but societies, have laboured to make us acquainted with the *present* state of the world, comparatively nothing has been done to throw light on that portion of geography which comprises the ages called the dark. Thus, the curious in geography have abundant means of becoming acquainted with the political state of our planet in the times of Alexander and of Augustus, of Charles V. and Victoria I., but are at an utter loss for a work which treats on the same subject at the period of the Crusades; and although those remarkable wars have found able *historians*, *geography*, the sister science, or rather the handmaiden of history, has been neglected in an astonishing degree. To remedy this defect, and furnish materials for a Geography of the Middle Ages, is the aim of the present work, and the 'Itinerary of R. Benjamin, of Tudela,' has been selected for that purpose, not only because it contains more facts and fewer fables than any other contemporary production which has come down to us, but also because it describes a very large portion of the earth known in the twelfth century. I am fully aware that what I now offer to the public are but *scanty* contributions towards the science, the study of which I aim to promote, but I hope to continue these labours, and by the publication of subsequent volumes of notes to make this work a book of reference to the student of MIDDLE AGE AND COMPARATIVE GEOGRAPHY," &c.

In this last paragraph M. Asher does himself positive injustice, and very much undervalues the importance of his labours. To obtain for them the high appreciation which his modesty has withheld, it will be sufficient to state, that he presents us, in the first place, with the original Hebrew text of Rabbi Benjamin, carefully corrected by comparison of MSS., and freed from those corruptions which have hitherto not only puzzled commentators, but filled them with mistrust. This is accompanied by an English translation, and followed by a volume of notes and dissertations, which are to be continued. In the notes, M. Asher displays much critical acuteness, with a thorough knowledge of his author. The dissertations (by Dr. Zunz, on the Geographical Literature of the Jews, and on the Geography of Palestine, and by M. Lebrecht on the Khalifate of Bagdad,) exhibit much information and erudition of a peculiar kind; and indeed M. Asher's volumes owe much of their power of interesting to the enthusiasm which they disclose on the part of enlightened and wealthy Jews, in tracing out and recording the literary efforts of their scattered nation.

Rabbi Benjamin, himself, felt the influence of that attachment to nationality which now actuates the last and best of his editors. With little or no learning, and travelling as a merchant, his inquiries were almost wholly confined to matters of trade, or to the state of the Jewish congregations:—

"He visited (says M. Asher) Jerusalem the city, and Bagdad the seat of the last princes of his nation, and availed himself of this pilgrimage to collect such information as might be agreeable and useful to his brethren. He was aware of their attachment to those sites and monuments, which attest their former grandeur, and to which they still look up with sweet melancholy; he felt the existence of that magic, invisible tie, which even in our days of indifferentism, roused the sympathy of all European Israelites in favour of the oppressed at Damascus, but he also knew that commerce was almost their only means of support, and its success the surest way to gain influence with the princes whose yoke oppressed the Jews of his own, and alas! of succeeding ages. These considerations gave the book its present form!"

The peregrinations of R. Benjamin appear to have taken place between the years 1159 and 1173. He says nothing of his native town, Tudela, in Navarre, but commences his narrative with Saragossa, whence he arrived in two days at Tarracona, "which contains," as the translator expresses it, "many Cyclopean and Pelasgic remains, and similar buildings are found nowhere else in the whole kingdom of Spain." It is M. Asher, and not Rabbi Benjamin, who vouches for the Pelasgian antiquity of Tarracona. The latter, keeping his attention fixed chiefly on his own nation, tells us, that among the wise and noble inhabitants of Narbonne the chief was Rabbi Calonymos; and he adds the significant remark, "this man holds landed property from the sovereigns of the country, of which nobody can deprive him by force." The political disqualification of the Jews in France, who could hold lands only by purchasing the protection of the sovereign, is here indirectly expressed. The Jewish traveller's description of Genoa is still further characteristic of his age:—

"The city is surrounded by a wall, no king governs over it, but senators chosen by the citizens and of their own body. Every house is provided with a tower, and in times of civil commotion war is carried on from the tops of these towers. The Genoese are masters of the sea, and build vessels called galleys by means of which they carry on war in many places, and bring home a vast deal of plunder and booty to Genoa."

The systematic piracy carried on for so many ages by the Barbary states, and at length suppressed in our own times with so high a hand, was originally learned by them from the Greeks and Italians. Our traveller describes Pisa also as a city of great extent, "containing about ten thousand fortified houses, from which war is carried on in times of civil commotion." In his description of Rome, "the metropolis of all Christendom," the ruined grandeur of the Imperial City is still recognizable in spite of the distortions wrought by ignorance and the intrusion of Hebrew traditions. "The city," he says, "contains numerous buildings and structures entirely different from all other buildings on the face of the earth. The extent of ground covered by ruined and inhabited parts of Rome amounts to four-and-twenty miles." He mentions the great Church of St. Peter, standing on the site of the palace of Julius Cæsar, and "the eighty halls of the eighty great kings, styled Emperors, from King Tarquin to King Pepin." The palace of Galba, he informs us, had a circumference of nearly three miles, and contained the bones of a hundred thousand slain, with sculptures representing the battle in which they fell. The Catacombs are alluded to in the account of a cave containing a king and queen on their thrones, surrounded by a hundred nobles of their court, all embalmed and in perfect preservation.

Among the curiosities of Rome, Rabbi Benjamin particularizes the statues of Sampson and of Absalon, and the copper pillars of King Solomon. He tells us, moreover, that Romulus, the founder of Rome, who feared David, King of Israel, and Joab, his general, constructed a road fifteen miles in length, under the mountains near Naples. M. Asher supposes this account of a subterranean road to refer to some of the great caverns of the Campanian district. Does it not relate to the ancient tunnel of Posilipo, the extent of which has been abridged by the successive convulsions affecting that territory? The Jewish traveller was but an indifferent antiquary, and his sketch of Rome in the twelfth century, drawn with constant reference to the past, presents a strange medley of fact and misconception. His description of Constantinople, on the other hand, exhibits, in lively and, we doubt not, faithful colours the luxurious and enervate capital of the Eastern empire. He says of the population, in language which doubtless contrasts them with the inhabitants of Western Europe,—

"The Greeks who inhabit the land are extremely rich, and possess great wealth of gold and precious stones. They dress in garments of silk, ornamented with gold and other valuable materials; they ride upon horses, and in their appearance they are like princes. The country is rich, producing all sorts of delicacies, as well as abundance of bread, meat, and wine, and nothing upon earth equals their wealth. They are well skilled in the Greek sciences, and live comfortably, 'every man under his vine and his fig tree.' The Greeks hire soldiers of all nations, whom they call Barbarians, for the purpose of carrying on their wars with the Sultan of the Thogarmim, who are called Turks. They have no martial spirit themselves, and like women are unfit for warlike enterprise."

In the twelfth century, the Turks possessed but a small portion of Asia Minor. Rabbi Benjamin is the first writer who mentions the Assassins or Hhashíshín, so named from their indulging in the inebriating drink made from the Hhashish, or wild hemp. He says of them,

"In the vicinity of Mount Lebanon resides the nation which are called Assassins, who do not believe in the tenets of Mohammedanism, but in those of one whom they consider like unto the Prophet Kharmath. They fulfil whatever he commands them to do, whether it be a matter of life or death. He goes by the names of Sheikh-al-Hhashishín, or their old man, by whose commands all the acts of these mountaineers are regulated."

The title, Sheikhu-l-Jibál, or the Sheikh of the Highlands, has been fantastically rendered by modern historians, the Old Man of the Mountain. The terror with which the keen poniards and desperate courage of his followers, who penetrated singly into the camps and fortresses of the crusaders, filled all Christendom, is proved by the place which their name now holds in nearly all the languages of Europe. M. Asher finds good reason for concluding that Rabbi Benjamin's travels hardly extended beyond Bagdad, though, to the results of his own experience

he adds some hearsay information respecting the Persian Gulph, Malabar, Ceylon, China, and Hhabesh, or Abyssinia. The editor is throughout eminently successful in removing those difficulties which originate in corruption of the text, and his notes leave little to be desired in the way of explanation. His style, although wonderfully correct for a foreigner, is yet far from reaching the purity of English idiom, and numerous errors of type and punctuation betray the unskilfulness of foreign compositors: yet these are but trifling blemishes, in spite of which M. Asher's work must be esteemed a very valuable addition to the literary treasures of the language in which he has written it.

The work, of which the title stands second at the head of this article, is still more important than the preceding; it contains a greater mass and variety of matter, of more striking originality, and of greater historic interest. There is some ground of complaint, indeed, in the confused or negligent arrangement of the pieces composing the volume. We have, for example, first,—The Wonders of Asia, by Jordan, or Jourdain de Severac, written in the early part of the fourteenth century. This is followed by a Spanish account of Tahiti, written in the latter half of the last century; after which come some vocabularies of African languages recently collected in Egypt. Then comes the narrative of Rubruquis, written a little after the middle of the thirteenth century, which is followed by that of John de Plano Carpini, who preceded the former traveller. Finally, come two other narratives, belonging the one to the tenth, the other to the beginning of the twelfth century. Comprehensiveness of plan, convenient grouping, and the chronological order appear to have little value in the eyes of the Société de Geographie. But, in compensation of this defect, M. d'Avezac, the Secretary of that Society, has prefixed to the narrative of Plano Carpini, a memoir on the early travels in Tatary, replete with learning and sound criticism, and every way worthy of the high reputation which he has already established. To this memoir, and to the chief of the early travellers in Central Asia, we shall devote the narrow space which still remains at our disposal.

The advance of the Mongols into Poland and Hungary in the thirteenth century, filled all Christendom with consternation. They destroyed Cracow, routed the Polish and German troops, led by the Count Palatine of Saxony, and laid waste the country wherever they came with fire and sword. The alarm occasioned by their advance extended even to the western shores of Europe, and the Frisians are said to have been reduced one year to great distress, in consequence of neglecting the herring fishery, through fear of Tatar invasion. The wits of that ignorant but pedantic age, affected to believe that these *Tartars* came from *Tartara*, or the infernal regions, and they called them therefore *Tartarei*, as well as *Tartari*; yet we cannot believe with M. d'Avezac, that the general corruption of the name *tata* or *thatha* into *tartar* originated in that quibble: it appears to be founded on an organic tendency common to many languages, and in fact *thatha* is pronounced *tartar* in the north of China.

It is worthy of remark, that in an age when the political intercourse of European states was imperfectly carried on; when the advantages of political co-operation were not understood; while congresses and treaties of four or of five powers were as yet unthought of, the Pope, the best informed, probably, of European princes, occasionally managed the common interests of all, and pleaded in a very efficient manner the cause of the Christian world. Innocent IV. sent into Tatary, to the paramount ruler of the Mongols, a mission, at the head of which was the minorite friar, John de Plano Carpini. The latter, though far advanced in years, executed successfully his arduous commission. Notwithstanding the rigours of the climate and unusual personal hardships to which he was exposed, he arrived safely in 1246 at the Mongol encampment, near Kara-korum, on the river Argún, which falls into lake Baïkal, and returned, after a little delay, with the Khan's letter. This curious document, as it has hitherto shared the fate of Carpini's narrative, in being published in a very incomplete and mutilated form, we shall here produce entire, and clothe it for the first time in an English dress:—

The strength of God, Cuyuc Khan, the lord of all men, to the great Pope,—Thou and all Christian nations dwelling in the West, have sent to us by thy messenger true and authentic letters; wishing, as we have heard from him, and as it is stated in thy letters, to maintain peace with us. Wherefore, if ye desire to have peace with us, do thou, Pope, and let all emperors, kings, rulers of nations, and chiefs of provinces, come before us without any delay, for the purpose of settling the peace and of hearing at once our answer and our will. Thy letters intimated that we ought to be baptized and become Christians; whereto we briefly answer thee, that we know not why we should do so. And again, it was said in thy letters, that thou art amazed at the slaughter of men, and above all of Christians, chiefly Hungarians, Poles, and Moravians. We answer thee again briefly, that we understand thee not. Nevertheless, lest we might seem to pass that matter over in silence, we deem it fit to give thee this reply; because they refused obedience to God and Chingis Khan, and wickedly put to death our messengers; wherefore God commanded that they should be destroyed, and gave them into our hands. And if God does not assist, what can man do to man? But ye Dwellers in the West, ye worship God, and ye think yourselves the only Christians, and hold others in contempt? but how do ye know on whom he pleases to bestow his favour? We worship God, and in his strength we shall destroy the whole earth, from east to west. For, if man were not the strength of God, what could human beings do?

About six years after the return of Plano Carpini, the King of France sent into Tatary the Franciscan William de Rubruquis, or Van Ruysbroek, who visited Kara-korum, and wrote a very ample and curious account of his journey. Our limits, however, will not allow us to glance at the adventures of those political missionaries, or at the geographical details mentioned in their narratives. We shall therefore confine ourselves to the following general remarks. The ground gone over by the friars in the thirteenth century has not, for the most part, been since explored by intelligent European travellers. A large portion of it indeed, including the city of Kara-korum, is now included within the limits of the Chinese empire, and is therefore beyond the reach of European curiosity. The importance of those missions in the historical point of view, the character of the men employed in them, and the value of their narratives, appear to have been hitherto very inattentively considered, and to be generally much underrated. Though Plano Carpini wore the monastic habit, he had not been bred in seclusion. He was well acquainted with the world, in which he played an active part, and joined to great experience, remarkable facility of address and command of language. It is manifest that he was selected for the mission on account of his great ability, particularly as a negotiator; and when we consider that he set forward on his journey in the 65th year of his age, that he had great physical trials to endure and overcome, that he executed his commission with address, and wrote a copious and instructive account of his journey, we shall find ourselves little justified in sneering at the mean qualifications of the minorite friar. The same remarks apply in some measure to Rubruquis. The narratives of both these travellers occasionally betray, it is true, both ignorance and credulity, but still, in pregnancy and vivacity of observation, they are far superior to most of the jejune geographical narratives of our own day; and if compared with the writings of Pliny, which in the thirteenth century were looked upon as the model of that kind of composition, their merit will be equally conspicuous. It is still further worthy of notice, that these narratives soon obtained a wide circulation. Roger Bacon, the greatest geographer of his time, had conversed with Rubruquis, and had compared his narrative, as he informs us, with those of Plano Carpini and others who had visited Central Asia.

These valuable narratives are now published for the first time, with critical care, and, in the case of Plano Carpini, with large additions of new matter. We cannot understand, however, why the text of any one manuscript should be implicitly followed, while the various readings of other manuscripts are employed only to adorn the margin. We should prefer a printed text as correct as sound emendatory criticism could make it, the justification of every change being presented in the notes. Thus, for example, instead of generally reading *Ingures*, and sometimes *Iugures*, we should have invariably taken the latter reading, since the people intended were unquestionably the Uighurs of modern writers. In Jebb's edition of R. Bacon's Opus Magnum, this name is read Ingres, whereas in Purchas's extract from the same work it is Iugres. Again, why should the name Kapthat be retained, when it is plain that some of the manuscripts furnish the true reading Kapchac, in Bacon Kaptac?

We shall close our observations on this excellent volume with a topic which incidentally forces itself on our notice. M. d'Avezac, in the notes to his elaborate memoir, frequently reprehends Malte-Brun for using the words of Sprengel without sufficient acknowledgment. Now we feel some surprise that the Secretary of the Société de Geographie should close his eyes to the fact that nearly every sentence of Sprengel's History of the Chief Geographical Discoveries (Geschichte der Wichtigsten Geographischen Entdeckungen) has been transferred by Malte-Brun to his History of Geography. The latter writer often mixes Sprengel's notes with his text, and changes the order of his paragraphs. Thus, the 417th page of Malte-Brun's History (second edition,) contains the 272nd and 273rd pages of Sprengel's (second edition); but the 418th page of the former writer goes back to the 247th of the latter. As Malte-Brun continually cites Sprengel among the authorities copied from the latter's pages, he practises a deception on his reader, and may be justly condemned as a plagiary of the first order.

A Collection of Letters, illustrative of the Progress of Science in England, from the Reign of Elizabeth to that of Charles II. Edited by J. O. Halliwell, Esq. F.R.S. Published by the Historical Society of Science.

This is the first publication of the Historical Society of Science, formed on the plan of the Camden Society, and having a particular, though not exclusive, view to the publication of documents connected with the history of *English* science.

The history of English science is not yet written. Foreigners have their histories, in which the rise of the subject is traced from its beginnings; but those who would know anything of the progress of mathematics, physics, astronomy, or natural and medical knowledge in England, must either begin their inquiries with

the seventeenth century, or must toil through many books to get a few scattered notices. When the Society now commencing its operations shall have its list of members completed, and its means of research organized, we may hope that they will succeed in placing this neglected department of history on its proper footing, and our own country in the place which it ought to have occupied in the works of foreign writers, but which it could not for lack of means. How was Montucla or Kastner to know anything about a country in which no pains were taken to create any sources of information?

The man of science has only a secondary want of the history of which we are speaking. He knows well enough the history of the brilliant seventeenth century, which, beginning with Napier and ending with Newton, left this country second to none in the boast of scientific fame. It is the man of history, the inquirer into the mode of formation of national habits, who is most interested in researches like those now before us. He does not believe that all at once, by virtue of the date 1600, the continent of Europe was able to blow up the flame of inquiry in England; but he thinks that there must have been a process going on at home which provided the fuel. The history of the preceding centuries will be to him a matter of curious and useful inquiry—if he can get at it.

There has been a singular sluggishness in our country, with respect to the fame of our ancestors in the ages which preceded Newton. Tiraboschi* knew, and stated, that the reviver of Greek geometry, was the Saxon Athelard, of Bath, in the translation of Euclid from the Arabic, which has for centuries borne the name of the commentator Campanus; but not one English writer (till very lately) ever took any notice of the fact, though any one who had even read the titles of the manuscripts in the Bodleian, would have seen reason to suspect it. From Bede to Athelard, from Athelard to Roger Bacon, from Roger Bacon to Recorde and Digges, and from these to Napier and Harriot, we have separate epochs, in which there is much to trace. The rise of the scientific character of the University of Oxford, the reasons of the subsequent decline, the effect of the English schools of writing, the resuscitation of energy which produced Wallis and his contemporaries, the rise of the Gresham College school of mathematicians, the growth of science at Cambridge, its peculiar history in the north of England, &c., are subjects which are well worth treatment. But from whence are the materials to come, which are in great part still manuscript in our libraries? When will it happen that a palæographist is also a mathematician, with enough of energy and leisure both to work the ore and the metal? We hope the Historical Society of Science will find the materials, and render it unnecessary to look for so enormous a task at the hand of any one person. And they may proceed to their work with the more confidence, that they are not responsible for the results. There is a vein which they are to open, and an ore which they are to extract. Whatever may be the per-centage of apparently useless matter which they bring up with the metal, it is not their business to make any final selection: and they could not fall into any more pernicious error than publishing upon any definite system of rejection. Whatever there may be to dig up, let us at least have large specimens of everything.

The present collection of letters is miscellaneous. Many of them are to Lord Burghley, and the number of different propositions made to that statesman by the *savans* of his time are highly illustrative of the state of philosophy: we may notice, *en passant*, that there are proposals from two different persons to construct a vessel which should sail against wind and tide. There is not, however, anything which can be oppositely quoted here: matters which would interest the general reader, such as Sir Samuel Morland's autobiography, would not give any idea of the scientific contents of the work.

Incidents of Travel in Central America, Chiapas, and Yucatan. By John L. Stephens.

[Second Notice.]

We were compelled to "break off in the middle," when describing the wonders of Copan; so that our return to Mr. Stephens's delightful volumes must, necessarily, be no less abrupt. The forest, it will be seen, has encroached upon these memorials of antique authority and religion, as the sands of the Desert upon the sphinxes and tombs of the Kings of Thebes.

"Our guides (says Mr. Stephens) knew only of this district; but having seen columns beyond the village, a league distant, we had reason to believe that others were strewed in different directions, completely buried in the woods, and entirely unknown. The woods were so dense that it was almost hopeless to think of penetrating them. The only way to make a thorough exploration would be to cut down the whole forest and burn the trees. This was incompatible with our immediate purposes, might be considered taking liberties, and could only be done in the dry season. After deliberation, we resolved first to obtain drawings of the sculptured columns. Even in this there was great difficulty. The designs were very complicated, and so different from anything Mr. Catherwood had ever seen before as to be perfectly unintelligible. The cutting was in very high relief, and required a strong body of light to bring up the figures: and the foliage was so thick, and the shade so deep, that drawing was impossible. After much consultation, we selected one of the 'idols,' and determined to cut down the trees around it, and thus lay it open to the rays of the sun. Here again was difficulty. There was no axe; and the only instrument which the Indians possessed was the machete, or chopping-knife, which varies in form in different sections of the country; wielded with one hand, it was useful in clearing away shrubs and branches, but almost harmless upon large trees; and the Indians, as in the days when the Spaniards discovered them, applied to work without ardour, carried it on with little activity, and, like children, were easily diverted from it. One hacked into a tree, and, when tired, which happened very soon, sat down to rest, and another relieved him. While one worked there were always several looking on. I remembered the ring of the woodman's axe in the forests at home, and wished for a few long-sided Green Mountain boys. But we had been buffeted into patience, and watched the Indians while they hacked with their machetes, and even wondered that they succeeded so well. At length the trees were felled and dragged aside, a space cleared around the base, Mr. C.'s frame set up, and he set to work. I took two Mestitzoes, Bruno and Francisco, and, offering them a reward for every new discovery, with a compass in my hand set out on a tour of exploration. Neither had seen 'the idols' until the morning of our first visit, when they followed in our train to laugh at los Ingleses; but very soon they exhibited such an interest that I hired them. Bruno attracted my attention by his admiration, as I supposed, of my person; but I found it was of my coat, which was a long shooting-frock, with many pockets; and he said that he could make one just like it except the skirts. He was a tailor by profession, and in the intervals of a great job upon a roundabout jacket, worked with his machete. But he had an inborn taste for the arts. As we passed through the woods, nothing escaped his eye, and he was professionally curious touching the costumes of the sculptured figures. I was struck with the first developement of their antiquarian taste. Francisco found the feet and legs of a statue, and Bruno a part of the body to match, and the effect was electric upon both. They searched and raked up the ground with their machetes till they found the shoulders and set it up entire except the head; and they were both eager for the possession of instruments with which to dig and find this remaining fragment. It is impossible to describe the interest with which I explored these ruins. The ground was entirely new; there were no guide-books or guides; the whole was a virgin soil. We could not see ten yards before us, and never knew what we should stumble upon next. At one time we stopped to cut away branches and vines which concealed the face of a monument, and then to dig around and bring to light a fragment, a sculptured corner of which protruded from the earth. I leaned over with breathless anxiety while the Indians worked, and an eye, an ear, a foot, or a hand was disentombed; and when the machete rang against the chiselled stone, I pushed the Indians away, and cleared out the loose earth with my hands. The beauty of the sculpture, the solemn stillness of the woods, disturbed only by the scrambling of monkeys and the chattering of parrots, the desolation of the city, and the mystery that hung over it, all created an interest higher, if possible, than I had ever felt among the ruins of the Old World. After several hours' absence I returned to Mr. Catherwood, and reported upwards of fifty objects to be copied. I found him not so well pleased as I expected with my report. He was standing with his feet in the mud, and was drawing with his gloves on, to protect his hands from the moschetoes. As we feared, the designs were so intricate and complicated, the subjects so entirely new and unintelligible, that he had great difficulty in drawing. He had made several attempts, both with the camera lucida and without, but failed to satisfy himself or even me, who was less severe in criticism. The 'idol' seemed to defy his art; two monkeys on a tree on one side appeared to be laughing at him, and I felt discouraged and despondent."

Mr. Catherwood's subsequent efforts were more fortunate, as the extremely curious series of illustrative plates testifies. With speculations on the date of these antiquities, among which numerous tablets of hieroglyphics form a prominent feature, we shall not trouble the reader, still less with considerations as to their origin: a few words more from Mr. Stephens are all we can make room for:—

"We did not find on either of the monuments or sculptured fragments any delineations of human, or, in fact, any other kind of sacrifice, but had no doubt that the large sculptured stone invariably found before each 'idol' was employed as a sacrificial altar. The form of sculpture most frequently met with was a death's head, sometimes the principal ornament, and sometimes only accessory; whole rows of them on the outer wall, adding gloom to the mystery of the place, keeping before the eyes of the living death and the grave, presenting the idea of a holy city—the Mecca or Jerusalem of an unknown people."

Not less interesting,—to comprehend all that we have to say of the subject of these antiquities, in the same section,—are the elaborate details and illustrations to be found in the second volume, of the ruins of Palenque, and the less-known remains at Santa Cruz del Quiché. But ere leaving a subject, to discuss which according to its full importance is here impossible, we cannot but draw the attention of geographers, artists, and antiquarians, not merely to the statements made by Mr. Stephens of the relics he actually saw, but to his recital of the traditions floating about the country of other ruins yet more extensive. For instance, the laughing padre of Santa Cruz del Quiché described another city four leagues from Coban, in the province of Vera Paz,—

—"as large as Santa Cruz del Quiché, deserted and desolate, and almost as perfect as when evacuated by

* The bibliography of any country cannot be properly known, except *from that country*, and literary history depends on bibliography. Lalande's earliest English book on Astronomy is Hood's on the Sphere (1590), of which he says 'L'Astronomie commencait à percer en Angleterre.' Now this work is one of the latest and worst of a large school of writers. Again, we had some years ago imagined, from all the evidence that we could collect, that the well-known Lucas de Burgo had never published an edition of Euclid, as he was said to have done; and we were (of course) much strengthened in our opinion by finding that the editor of Fabricius had formed the same. But we were brought at last to the conviction that the bibliography of each country must be left to its natives, by picking up on a stall the book itself, Euclid by Lucas above named.

its inhabitants. He had wandered through its silent streets and over its gigantic buildings, and its palace was as entire as that of Quiché when he first saw it. This is within two hundred miles of Guatimala, and in a district of country not disturbed by war; yet, with all our inquiries, we had heard nothing of it. And now, the information really grieved us. Going to the place would add eight hundred miles to our journey. Our plans were fixed, our time already limited; and in that wild country and its unsettled state, we had superstitious apprehensions that it was ominous to return. My impression, however, of the existence of such a city is most strong. I do most earnestly hope that some future traveller will visit it. He will not hear of it even at Guatimala, and perhaps will be told that it does not exist. Nevertheless, let him seek for it; and if he do find it, experience sensations which seldom fall to the lot of man. But the padre told us more; something that increased our excitement to the highest pitch. On the other side of the great traversing range of Cordilleras lies the district of Vera Paz, once called Tierra de Guerra, or land of war, from the warlike character of its aboriginal inhabitants. Three times the Spaniards were driven back in their attempts to conquer it. * * At this day the north-eastern section, bounded by the range of the Cordilleras and the State of Chiapas, is occupied by Candones or unbaptized Indians, who live as their fathers did, acknowledging no submission to the Spaniards, and the government of Central America does not pretend to exercise any control over them. But the thing that roused us, was the assertion by the padre, that four days on the road to Mexico, on the other side of the great sierra, was a living city, large and populous, occupied by Indians, precisely in the same state as before the discovery of America. He had heard of it many years before at the village of Chajul, and was told by the villagers, that from the topmost ridge of the sierra this city was distinctly visible. He was then young, and with much labour climbed to the naked summit of the sierra, from which, at a height of ten or twelve thousand feet, he looked over an immense plain, extending to Yucatan and the Gulf of Mexico, and saw at a great distance a large city spread over a great space, and with turrets white and glittering in the sun. The traditionary account of the Indians of Chajul is, that no white man has ever reached this city; that the inhabitants speak the Maya language, are aware that a race of strangers has conquered the whole country around, and murder any white man who attempts to enter their territory. They have no coin or other circulating medium; no horses, cattle, mules, or other domestic animals, except fowls, and the cocks they keep under ground, to prevent their crowing being heard.

"There was a wild novelty — something that touched the imagination — in every step of our journey in that country; the old padre, in the deep stillness of the dimly-lighted convent, with his long black coat like a robe, and his flashing eye, called up an image of the bold and resolute priests who accompanied the armies of the conquerors; and as he drew a map on the table, and pointed out the sierra to the top of which he had climbed, and the position of the mysterious city, the interest awakened in us was the most thrilling I ever experienced. One look at that city was worth ten years of an every-day life. If he is right, a place is left where Indians and an Indian city exist as Cortez and Alvarado found them; there are living men who can solve the mystery that hangs over the ruined cities of America; perhaps who can go to Copan and read the inscriptions on its monuments."

Making every allowance for the exaggeration which the imagination of a solitary, enthusiastic man is apt to impress upon his narrations, and (for caution's sake) conceiving the padre's view from the sierra of the primæval Indian city to be little more exactly detailed than the place and products of that Cipango the description of which exercised such an influence over Columbus, the passage is striking, and contains matter worthy of inquiry and research.

But let us return from these shadowy glimpses of the past to the more tangible travelling adventures recorded by our friend in so sprightly a fashion. Having laid open the idols of Copan, and provided Mr. Catherwood with many weeks' work, the diplomatic agent of the United States started in search of the government of the country. Crossing the boundary line of the state of Honduras, he was presently at a "long low substantial-looking hacienda," surrounded by a park, and "large field with stone fences, bars, and cattle-yard, that looked like a West-Chester farm." This chanced to be the property of one Don Clementino, none other than a near kinsman of the churlish Don Gregorio, but of more various and amusing quality,—a much younger man, and, as the following extract will show, not little of a beau:—

"He was jauntily dressed in white jacket and trousers, braided and embroidered, a white cotton cap, and over it a steeple-crowned glazed hat, with a silver cord twisted round as a band, a silver ball with a sharp piece of steel as a cockade, and red and yellow stripes under the brim. He had the consequential air and feelings of a boy who had suddenly become the head of an establishment, and asked me, rather superciliously, if I had finished my visit to the 'idols;' and then, without waiting for an answer, if I could mend an accordion; then, if I could play on the guitar; then to sell him a pair of pocket-pistols which had been the admiration of Don Gregorio's household; and, finally, if I had anything to sell. With this young gentleman I should have been more welcome as a pedlar than an ambassador from any court in Europe, though it must be admitted that I was not travelling in a very imposing way. Finding I had nothing to make a bargain for, he picked up a guitar, danced off to his own music, and sat down on the earthen floor of the piazza to play cards."

This mercurial gentlemen, who seems to have been as arrant a barterer as a New-Englander, did at last contrive to sell a mule to his guest, mounted upon which, Mr. Stephens commenced ascending the great sierra. The ascent was rugged and tiresome, and when surmounted, the hospitality of the Cura of Esquipulas was eminently welcome. Our tourist does the fullest justice to the benign influence exercised in these wild countries by the priests. They seem to be the patriarchs of the villages where they reside—comforters and tutors resorted to on every occasion by the untutored Indians—right-hand men to the alcades, and generally exercising their prerogatives with a humanity and self-postponement worthy of the best and earliest days of the Church. The Cura of Esquipulas, while dwelling upon the loneliness and hardship of his life, told of a time when—

"The troops of Morazan invaded the town, and for six months he lay concealed in a cave of the mountains, supported by Indians. Lately the difficulties of the country had increased, and the cloud of civil war was darker than ever. He mourned, but, as he said, he had not long to mourn; and the whole tone of his thoughts and conversation was so good and pure, that it seemed like a green spot in a sandy desert. We sat in the embrasure of a large window; within, the room was already dark. He took a pistol from the window-sill, and, looking at it, said, with a faint smile, that the cross was his protection; and then he put his thin hand in mine, and told me to feel his pulse. It was slow and feeble, and seemed as if every beat would be the last; but he said it was always so; and, rising suddenly, added that this was the hour of his private devotions, and retired to his room. I felt as if a good spirit had flitted away."

As a *pendant* to this twilight sketch, we must make room for the jolly Father Boniface and his household, to whom Mr. Stephens was indebted for a hospitable reception at Quezaltepeque:—

"He was a man who could bear a good deal, being above six feet, broad shouldered, and with a protuberance in front that required support to keep it from falling. His dress consisted of a shirt and pair of pantaloons, with button-holes begging for employment: but he had a heart as big as his body, and as open as his wearing apparel; and when I told him I had ridden from Esquipulas that day, he said I must remain a week to recruit. * * The household of the padre consisted of two young men, one deaf and dumb, and the other a fool. The former possessed extraordinary vivacity and muscular powers, and entertained the padre by his gesticulations, stories, and sleight-of-hand tricks, and particularly with a steel puzzle. There was something intensely interesting in the kindness with which the padre played with him, and the earnestness with which he hung around his gigantic master. At times the young man became so excited that it seemed as if he would burst in the effort to give utterance to his thoughts; but all ended in a feeble sound, which grated upon my nerves, and seemed to knit him more closely to the good-hearted padre. The latter was continually changing the puzzle, but the ingenuity of the lad could not be defeated. The poor simpleton meanwhile looked on with admiration. The padre offered him half a dollar if he could open it, and both he and the deaf and dumb lad laughed at the awkward attempts of the simpleton. The padre finished with a warm panegyric upon the worth of both, which the deaf and dumb boy seemed to understand and thank him for, but which he that had ears seemed not to hear. The padre insisted on my taking his own cartaret, which was unusually neat, and had a moschetonetting. It was my best bed since I left Colonel M'Donald's at Balize. Before I was up he stood over me with a flask of agua ardiente. Soon after came chocolate, with a roll of sweet bread; and finding that it was impossible to get away that day, I became a willing victim to his hospitality. At nine o'clock we had breakfast; at twelve, fruit; at two, dinner; at five chocolate and sweet bread; and at eight, supper, with constant intermediate invitations to agua ardiente, which the padre, with his hand on that prominent part of his own body, said was good for the stomach."

"Passing on, I met a party of women, dressed in white, with red shawls over the tops of their heads. I have seen enough of fancy colours in women to remove some prejudices, but retain an oldfashioned predilection for white faces; and here I remarked that the whitest women were the prettiest, though the padre did not agree with me entirely. Under the shed of a deserted house near by was an old Indian with ten or twelve Indian girls, teaching them the catechism. They were dressed in red plaid cotton, drawn round the waist and tied in a knot on the left side, and a white handkerchief over the shoulders. Other parties were out in different places, organizing for a village fête in honour of some saint; and toward evening, while sitting with the padre, now dressed in his long black gown, a procession advanced, headed by the oldest man in the village, with white hair and beard, and a lame man with two or three associates playing on violins. Before reaching the house they set off five or six rockets, and they all went up and saluted the padre, kissing the back of his hand; the women went inside, carrying bundles wrapped in clean white napkins; and when I went in to take my chocolate, I found the table piled up with cakes and confectionery. Afterward all went to the church for vesper prayers. I could but think, what afterward impressed itself upon me more and more in every step of my journey in that country, blessed is the village that has a padre. During the day, the deaf and dumb boy had contrived several times to make me understand that he wished to accompany me, and in the evening the padre concluded to make him happy by giving him a journey to Guatimala. Early in the morning the convent was in commotion. The good padre was unused to fitting out an expedition for Guatimala. Many things were wanting besides the mules, and the village was laid under contribution. During the bustle, a single soldier entered the village, and created an alarm that he was the pioneer of others come to quarter upon them. The padre told him who I was, and that the guard must not molest me. At length all was ready; a large concourse of people, roused by the requisitions of the padre, were at the door, and among them two men with violins. The padre directed his own gigantic energies particularly to the eatables; he had put up chocolate, bread, sausages, and fowl; a box of cakes and confectionery; and, as the finale, the deaf and dumb lad came out of the house, holding at arm's length above his head the whole side of an ox, with

merely the skin taken off and the ribs cracked, which was spread as a wrapper over one of the cargoes, and secured by a netting. A large pot, with the bottom upward, was secured on the top of another cargo. The padre took a kind leave of me, and a most affectionate one of the deaf and dumb lad; and at nine o'clock, with violins playing, and a turn-out that would have astonished my city friends, I made another start for the capital."

With this lively picture we must conclude for the present.

OUR LIBRARY TABLE.

Selections from the Dispatches and General Orders of the Duke of Wellington, by Lieut.-Col. Gurwood.—A most acceptable volume. The original publication, which we took leave strongly to recommend to the public, has been received with general welcome,—still the unavoidable price placed it beyond the means of the great body of the public. Here, then, we have the military dispatches, many important letters, the general orders of detail and discipline, with other judicious selections, presented in a single substantial volume;—a work worth all the Lives of the Duke which have lately perplexed the public by their several claims and pretensions, put together. It is itself a life—a genuine autobiography.

Memoranda on France, Italy, and Germany, by Edwin Lee, Esq. M.R.C.S.—Here is another of these highway books. The full force of this objection Mr. Lee acknowledges, and puts forward as a special excuse, that he has restricted his memoranda within very narrow limits, and that his object is chiefly to impart information respecting such matters as concern travellers for health. But even in this limited range he is met by formidable predecessors. Sir J. Clarke, Drs. Granville, Johnson, and Farre, whose works we have already noticed, and even Mr. Lee himself, in previous publications, are each in their several ways preoccupants, whose observations have left him little to add, upon which to raise an increase of reputation, or even to lay a well-founded claim on public attention. It must be admitted, however, that he by no means stands alone in this predicament, and that an almost boundless licence is in these times given, or at least assumed, for writing on the most hackneyed themes, as if no one had touched them before. Mr. Lee may therefore not be very much surprised or hurt, if we say that we do not think he has made out a case for publication, or that no great void would have been felt in English literature had his memoranda never appeared. To those readers however to whom the subject is new, and to whom a few precise ideas, at no very great cost of time or money, are a desired object, the present work will repay the trouble of perusal. If the extent of surface embraced be compared with the scanty limits of a single volume, it will be clear that its sketches must be of the most general character, and treated after the most touch-and-go fashion. This circumstance, if it gives to the well-informed reader an expression of flimsiness, may be to the tyro a cause of distinctness and simplicity. In the doctrinal portions of the work more especially we are inclined to think that Mr. Lee gains in precision by this enforced brevity; the avoidance of cumbrous details agrees very well with his simple and common sense views. This remark, however, is confined principally to that part of the work which relates to Italy. The author having already published on the Spas of Germany, has confined himself, in the German part of the present publication, principally to description.

Joseph Rushbrook; or, the Poacher, by the Author of 'Peter Simple;' 3 vols.—'Joseph Rushbrook' is own brother to 'Jacob Faithful,' 'Midshipman Easy,' 'Poor Jack,' and all the other "yarns" which Captain Marryat, beginning at random and going on as chance directs, conducts to a triumphant close. The Captain has never, we think, been more audaciously regardless of probabilities than in the present instance. The Rushbrooks are poachers; but father and mother are naturally of such a "fine quality," as regards feeling and behaviour, that when a splendid fortune befalls them, a few months' experience, and the exchange of one county for another, are sufficient to make them presentable gentlefolks. The son, too, though brought up with the demoralizing example of a lawless father for ever before his eyes, and assisting in the practice of his craft, pursues his subsequent career with such a store of principle, self-sacrifice, and grateful duty to his parents, as might befit the heir of the wisest of the Russells or Evelyns, who, in novels immemorial, have been the models and depositories of truth and beneficence. Still the tale moves on. Though it begins in England, it presently gets to St. Petersburgh—little Joey being whirled to the Russian capital, by a casualty we will not disclose, as therein lies the whole invention of the story—from St. Petersburgh back to Gravesend, for Captain Marryat, even in a tale of a poacher, could not but give us a taste of his profession. The incidents are as dashing as the changes of scene: Irish fortunehunters and Polish Countesses mingle in the dance—a pretty young lady falls in love with a "needy knife-grinder"—and in the midst of the harlequinade, the incomparable Joey contrives to grasp both love and money—to pick up a fortune *à la* Marryat, and a helpmate; with a fine *tableau* of family affection and a most effective touch of tragedy, to wind up the affair in first-rate style. Had 'Joseph Rushbrook' been the first and not the last of a series, it would have deserved a hearty welcome. As it is, however wonderfully the cups and balls be manœuvred, when once the conviction is impressed, that it is sleight of hand and not reality, the charm loses on every repetition.

To make the full value felt of such a novel as 'Joseph Rushbrook,' which, faulty or perfect, is undeniably the work of a clever hand, the reader disposed to be fastidious should turn, immediately, to such a tale as *The Old Earl and his Young Wife*—three volumes of strange manufacture. Not long since we had occasion to notice, how the choice of a particular epoch had compelled Miss Pickering to treat of situations which had already been illustrated by a Scott; but here are brought in, neck and heels, the very personages and adventures which gave such a savour of life to 'The Fortunes of Nigel.' The introduction of King Jamie might have been excused, and we could have stretched a point so far as to admit that Lord Thurso, in his shrewdness, and causticity, and selfishness, was but a "far-awa" cousin to Sir Mungo Malagrowther; but when we find a second edition of Captain Peppercull—a coarse repetition of the scenes at Dame Ursley's—and the very conjunction of a rescue on the Thames by the agency of a 'prentice boy,—nothing ought to stay a prosecution for downright theft. These stolen goods, too, were not wanted. The story, such as it is, of a beautiful girl, who sells herself to a fulsome old court libertine, for the purpose of protecting her friends in trouble—among the said friends being a Catholic priest under suspicion, and a young Irish nobleman, for whose lands the mouths of many of King Jamie's Scotch followers are watering,—might have been brought to a natural close without the necessity of employing such ill-advised plagiarisms. As it stands,—though not without indications of cleverness and humour,—the tale is as disagreeable as it is unnatural.

The Lover and the Husband: The Woman of a certain Age, &c., edited by Mrs. Gore; 3 vols.—It is a pious and laudable custom of the guild of the Holy Trinity to set up lights and other intelligible indications for the guidance of mariners upon those parts of the coast which are dangerous from sunken rocks, sandbanks, and other obstructions. On the sea of literature this onerous duty devolves on the critic; we have good reason, therefore, to be thankful to Mrs. Gore, who has so far anticipated our labours, as to set up in front of these volumes an unmistakable Pharos, in the shape of a dedication, to warn those whom it may concern, against this translation of M. Bertrand's far-famed 'Gerfaut,' and indeed against all translations from the light literature of our neighbours. "The frankness of immorality, whether of circumstance or principle, so often charged against French novels" by Quarterly Reviewers, and other starched personages, arises, according to Mrs. Gore, not from their reflecting a society so strangely disorganized, and a code of *im*morals so constructed as to give grave matter for painful thought to all who have courage to face the truth and to examine the causes leading to such corrupt results; on the contrary, the lady declares the exceptionable morality of these works is to be accounted for by the fact that young persons do not read novels in France; and that the piquant combinations of unlawful passions which, with little variation, are the theme of these fictions are "a *recreation for persons careworn with the business of life, and too firm of principle to be injured by light or frivolous pastimes.*" A Quarterly Reviewer might think such a strange theory of permissible relaxation, enunciated by a popular writer, ought not to pass without reprobation, and that the obvious unconsciousness of offence on the part of her who broaches it, makes the duty only the more imperative; but we deduce from it the wholesome truth, that if "young persons" are not permitted to read these novels in France, they cannot be proper for "young persons" in England; and we doubt whether any woman of reputation, notwithstanding the miserable compliment to her "firm principles," would choose to open a work which is avowedly seasoned highly with immoralities to suit the vitiated and palled appetite of middle age. As regards the volumes themselves, they do not call for any extended analysis. The power, the passion, and the local and graphic truth of 'Gerfaut' are but dimly shadowed forth in the translation. To turn modern French into English is not so easy a task as many imagine: it requires a minute and delicate appreciation of the mysteries of style, a control over language, and a knowledge of the points where English and French sympathies meet and diverge, belonging only to veteran writers, whose labour in these days of familiar intercourse with the continent would be better bestowed in the production of an original work.

Count de Denia: a Play, in Five Acts, by Horatio Huntley Hoskins.—The preface to this play raises an expectation which, we are bound to say, the play itself does not disappoint. We like to see a connexion between a work and its preface; and this author, instead of taking (as is too usual) an unfair advantage of the opportunity which the latter affords, either to propitiate or abuse the critic, uses it for laying down a proposition, which he then sets about illustrating by his drama. "Every Englishman," he says, "enjoys the freedom of an independent country, where the press is open alike to *all degrees* of composition (immoral excepted), as well as to all degrees of men;"—and of this British latitudinarianism he makes his own play an extreme example. The work is better calculated, however, to assert the truth, than the policy, of this freedom of the press. "If," says Mr. Hoskins, "an author's production be learnedly digested, it will raise itself from the fulsome depths of obscurity, even unto the wave of fame whereon it will for ever float in undisturbed security. If, on the other hand, it be a conglomeration of nonsense, it will overwhelm itself, and be for ever hidden beneath the sand of its own foundation." We feel, then, that the five-act play of the 'Count de Denia,' like the eastern desert, has but a sandy prospect. The drama has, nevertheless, certain peculiarities of structure, which distinguish it from the large proportion of its class. Of these, the most remarkable is the absence of plot. Another, which is either a cause or a consequence (we are not certain which) of the first, is the independent action of the characters. Aristotle has rarely been more gallantly defied. One of the leading personages disappears in the first act, and is "no more seen," and several, including the heroine, introduce themselves only towards the close of the play. Of these, one, a prince of the blood-royal—no less a personage than Henry of Trastamare—would have done well not to come at all, for he comes only to be slain. Eight words and a "scream" are all that the author extracts from a personage from whom we had certainly been led to expect a more conspicuous performance; and then the prince dies; in London, too, for Mr. Hoskins deals very independently with other literary authorities than Aristotle. One unity, however—not insisted on by Aristotle—the author introduces. The whole of his *dramatis personæ* are divided into two categories or families, on the Manichæan principle, of good and evil agents:—and, while of the estimable portion, it might, without exaggeration, be said, "where virtue is, these are most virtuous,"—all pattern men and women, but the same pattern; the ruffians are, we think, some of the worst men it has ever been our misfortune to meet with. Their habit of swearing is most distressing—much more so than a habit of weeping, which prevails amongst the opposite party,—that is, amongst its men; for the women do not share

in the weakness,—yet more tears are shed, we think, in this play than in any other with which we are acquainted. Altogether, we can, certainly, recommend the 'Count de Denia' as a novelty in dramatic literature.

The Genius, and other Poems, by William Harper.—The author of these fifty pages of verse is, we suspect, very young. If he be not, then we counsel him to abandon the Muse: if he be, then he may profit by a word of advice. Let him, as he has the faintest hope of prospering in her service, at once, and for ever, abandon the model which he has selected for his poem of 'The Genius.' Not that we pretend to understand the poem in question, but that does not prevent our seeing very well what its author would be at, and apprehending that he has no objection that its impression on the reader should be that of vagueness and mystery, and does not greatly care if he be even called unintelligible. It is too late—or too early—to be a copyist of Byron; and if Mr. Harper be wise he will avoid being a slavish copyist of the mere forms of any man's genius. The genius, itself, cannot be copied; and what he has of his own may be compromised, by being overlooked, in the attempt. Mr. Harper may depend upon it, whatever meanings he has—supposing him to have had any, and to know what they are—in this poem, the public will neither take them for granted nor go in search of them, because of his having covered them with one of Byron's cast-off veils (utterly cast-off by himself in his lifetime, and since worn threadbare by his valets), mistaking it, perhaps, for his prophet-mantle. There are lines in this poem which imply a sense of poetry, crude and unripe, but not unpromising, if, as we have said, the author's years be unripe too: and the minor pieces suggest that he may, one day, hope to succeed best where he is most simple; but they are none of them good enough (to borrow the language of a world which has a poetry of its own) for "present quotation."

Fiesco, translated from the German of Schiller.—If Schiller had never found an English interpreter in Coleridge, the translator before us would still have been most unwise to offer himself as the expounder of oracles which are obviously too profound for his apprehension; but after such an introduction into our literature as has fallen to the fortune of few foreign poets of any age, the boldness of this attempt, weighed with its conspicuous failure, merits no ordinary reprobation. A poet can only be fitly and fully rendered by a poet; and no foreign piracy of an author's works, against which the spreading advocacy of an international copyright is directed, can do him half such grievous wrong as that liability to mutilation and defacement which he suffers at the hands of translators, and which no law for the protection of literary property can ever reach. The former can but touch the temporal and pecuniary reward of that fame, which it, at the same time, recognizes and diffuses; the other attacks at once the glory and its rewards: the one alienates a portion of those material and beneficial offerings which the votaries of literature would carry to the shrine of genius, if nowhere stopped by the way; but the other wrongs the divinity and desecrates the shrine itself. The danger to the original poet is, however, less in the case of a translator like him before us, than in that of one whose ability for the task which he has undertaken were more doubtful. No knowledge of the original play is necessary to convince the reader that this translator wants two essential qualities of successful translation,—a competent knowledge of the language from which he translates, and a competent knowledge of (or at least the power to deal with) his own: and thus, if the bard be not rendered, he is not wronged. Perhaps the translator's consciousness of the latter of these defects may be a reason why he occasionally prefers to render his author into *French*. It is but justice to say, however, that across the dreary flat of this translation, there passes, at times, a momentary breath that speaks to the heart of a reader of English poetry, as if it came from his poetical paradise,—a suspicion that he has "heard something like this before," in the fields where he gathered his sweetest flowers—

> His heart is idly stirred,
> For the same sound is in his ears
> Which in those days he heard.

"My bosom's lord sits lightly on his throne!"—why does Shakspeare rise before us at the sound? Can he really have been committing larceny upon Schiller; and this be a restitution of our translator's, in part compensation for all the poetry of the German which he has wasted in his thriftless attempt at transfusion? Shakspeare was a great plagiarist: he borrowed all men's themes, and rang immortal changes on them, but we never before heard of his catching inspiration from the harp of Schiller.

The Handmaid, by the Rev. John Davies.—In the five lectures or dissertations that form this volume, the reverend author regards philosophy as the handmaid of religion, and considers literary pursuits as subservient to the promotion of moral and spiritual improvement. Viewing with approbation the increase of schools, institutes, philosophical societies, and lyceums, he is anxious that the national movement should advance in a right direction. Such an example is of great value; a clergyman can effect much for the religious and moral improvement of his flock by taking a direct share in their intellectual advancement. Mr. Davies's lectures contain no new views of science, but they place much useful information before those who from want of leisure or opportunity have not the means of acquiring profound knowledge, and they show how every exercise and improvement of the faculties may be combined with increased reverence for the great Author both of the universe of matter and the universe of mind.

Hints on the Art of Teaching.—This valuable little work relates entirely to the education of young ladies; it is full of useful suggestions and practical hints, which deserve the attentive consideration of all heads of families.

Practical English Grammar, by W. J. Simmonite.—We have not discovered the peculiarity in this grammar which renders it more practical than any of the thousand and one treatises already existing on the same subject.

[Advertisement.]—Just published, in demy 8vo., neatly bound in cloth, price 8*s.* 6*d.*, illustrated by a Map, &c., THE NEGROLAND OF THE ARABS EXAMINED AND EXPLAINED; or, an Inquiry into the Early History and Geography of Central Africa. By William Desborough Cooley.—"This Essay has for its object to establish the early geography of Central Africa on a solid basis. It aims at offering a clear and well-grounded explanation of the geographical descriptions of Negroland, transmitted to us by Arab writers; and, by thus connecting the past with the present, at giving an increased value to the historical information derived from the same sources. The task here undertaken has more of novelty in it than may be at first suspected. Hitherto no attempt whatever has been made to explain the Arab geography of Negroland by treating it as a whole, and as the immediate subject of investigation: yet no department of the wide field of literature stands more in need of critical labour, or appears more justly entitled to it."—J. Arrowsmith, 10, Soho Square.

[Advertisement.]—Lately published, neatly printed in cr. 8vo. price 3*s.* 6*d.* cl., COOLEY'S GEOMETRICAL PROPOSITIONS DEMONSTRATED; being a KEY to the Exercises appended to his edition of the 'Elements of Euclid.' Upwards of One Hundred and Twenty Propositions, deduced from the principles established in the First Six Books of Euclid, are illustrated in it by New Diagrams, and will afford the Teacher a ready means of exercising the ingenuity and analytical resources of his Pupils.—Whittaker & Co., Ave Maria-lane; of whom may be had, Cooley's Elements of Euclid, uniform with the above, price 4*s.* 6*d.*; and Cooley's Figures of Euclid, with the Enunciations, price 1*s.* 6*d.*

List of New Books.—Buckingham's Evils and Remedies of the Present System of Popular Elections, 12mo. 5*s.* cl.—Thurlow's Land Surveyor's Ready Reckoner, new edit. bd. in red, 2*s.*—Gideon Giles, the Roper, by Thomas Miller, 8vo. 13*s.* cl.—Spencer's (the Right Hon. William) Poems, &c. royal 18mo. 7*s.* 6*d.* cl.—Naturalist's Library, Vol. XXX. (Marsupials,) 12mo. 6*s.* cl.—Eve's Catechism, 1st series, new edit. 12mo. 9*d.* swd.—Dr. Prichard's Physical History of Mankind, Vol. III. Part I. 3rd edit. 8vo. 16*s.* cl.—Alice Russell, and other Tales, post 8vo. 10*s.* 6*d.*—Bishop Shuttleworth's Sermons, 2 vols. 8vo. 24*s.*—Beavan's (the Rev. James) Account of the Life and Writings of St. Irenæus, 8vo. 10*s.* 6*d.*—Davy's (Bishop) History of England, 5th edit. with frontispiece, 18mo. 2*s.* 6*d.*—New Library of Useful Knowledge: Geology, and Physiology of Health, 12mo. swd. 6*d.* each.—Reichard's France, 12mo. (large and small paper) 10*s.* 6*d.*—Corner's Turkey and the Ottoman Empire, 12mo. 3*s.* 6*d.* cl.—Head's (the Rev. W. E.) Dialogues on the Apocalypse, 12mo. 4*s.* cl.—Hawker's (the Rev. Dr.) Paraclesis, 18mo. 6th edit. 1*s.* 3*d.*—Maria Hack's Lectures at Home, 2nd edit. 12mo. 4*s.* 6*d.* cl.—Miles's (the Rev. E. P.) Lectures on Daniel, 2nd series, 12mo. 5*s.* cl.—Krummacher's Kingdom of Grace, and Christ in the Wilderness, 2nd edit. 12mo. 2*s.* 6*d.* cl.—Hutton's Devotional Exercises, 3rd edit. revised and enlarged, 12mo. 3*s.* 6*d.* cl.—Sir Isaac Newton's Historical Account of two Notable Corruptions of Scripture, 12mo. 3*s.* bds.—The Weather Book, Three Hundred Plain Rules for telling the Weather, 32mo. 1*s.* cl.—Pictorial History of England, by the Rev. N. Meeres, 12mo. 3*s.* cl.—Rouillon's French Exercises, 18mo. 3*s.* 6*d.* hf-bd.

THE CANDID WOOING.

BY CHARLES MACKAY.

I cannot give thee all my heart,
Lady, lady,—
My faith and country claim a part,
My sweet lady.
But yet I'll pledge thee word of mine
That all the rest is truly thine;—
The raving passion of a boy,
Warm though it be, will quickly cloy—
Confide thou, rather, in the man
Who vows to love thee all he can,
My sweet lady.

Affection, founded on respect,
Lady, lady,
Can never dwindle to neglect,
My sweet lady.
And while thy gentle virtues live
Such is the love that I will give.
The torrent leaves its channel dry,
The brook runs on incessantly;—
The storm of pascion lasts a day,
But calm true love endures alway,
My sweet lady.

Accept then a divided heart,
Lady, lady,
Faith, *Friendship*, *Honour*, each have part,
My sweet lady.
While at one altar we adore,
Faith shall but make us love the more:
And *Friendship*, true to all beside,
Will ne'er be fickle to a bride:
And *Honour*, based on love and truth,
Shall last beyond the charms of youth,
My sweet lady.

OUR WEEKLY GOSSIP.

Letters of the 16th June from St. Vincent, announce the arrival of the Niger Expedition at the Cape de Verde Islands on the 3rd June, after a pleasant passage of twenty-one days, including five days at Madeira and two at Teneriffe. The ships were to sail on the following day for Sierra Leone and Cape Coast, and expected to enter the River Niger on the 10th July.

The latest addition to the wonders of the Polytechnic Institution, is an ingenious adjunct by Mr. Bains, to the electro-magnetic telegraph: by which, not only is the message reported, but recorded in print the very moment of its arrival—and therefore almost of its utterance. An alphabetic dial-plate on which, through the instrumentality of an index, the word or sentence is indicated, letter by letter, communicates by the wire conductors with a wheel, on the edge of which corresponding characters are set in relief. By a simple contrivance, these are charged with printers' ink—and on the touch of a trigger, in communication with the dial, protruded so as to leave their mark on a cylinder covered with white paper. The operation seems to be certain;—of course its comprehensiveness and rapidity would be largely increased by the use of symbols; and should short-hand characters be employed, the feat becomes possible of a speech being printed three hundred miles off, at the very moment of its utterance. The marvels of scientific discovery can little further go.

By letters from Florence, we learn that the Grand Duke of Tuscany has just appointed Count Gråberg af Hemsö to be librarian of his extensive and valuable library in the Palazzo Pitti. This collection is well-known to English travellers, owing to the liberal manner in which the Grand Duke makes it accessible to all; and from M. de Gråberg's acquaintance with the chief languages of Europe, it might not have been easy to select in Florence a person better qualified to fill the office of librarian.

The Paris papers announce the death, in that capital, of M. Savary, member of the Academy of Sciences, and of the *Bureau des Longitudes*. The same journals state that Theresa Elssler is on the point of proceeding to join her sister Fanny, in America, where they will remain together a year; at the end of which time, both sisters purpose to retire from the stage. There seems to be no end, at the *Théâtre Français*, of *débutantes* aspiring to a rivalry with Mdlle. Rachel. The last was a Mdlle.

Halley, who seems to have attacked the difficult character of *Clytemnestra*, without the slightest success.

BRITISH INSTITUTION, PALL MALL.

The Gallery, with a Collection of Pictures from the Italian, Flemish, and Dutch Schools; also the works of the deceased English Artists, Sir J. Reynolds, Wilson, Gainsborough, Hogarth, and a Selection from the pencil of the late Thomas Stothard, Esq. R.A., IS OPEN DAILY, from Ten in the Morning till Six in the Evening. Admission, 1s.; Catalogue, 1s.

WILLIAM BARNARD, Keeper.

THE DIORAMA, REGENT'S PARK.

The TWO NEW PICTURES now exhibiting, represent the Interior of the CATHEDRAL OF AUCH, in the South of France, and the SHRINE OF THE NATIVITY, at Bethlehem, taken from a sketch made on the spot by D. Roberts, R.A., in 1839, with various effects of light and shade. Both Pictures are painted by M. Renoux. Open from Ten till Five.

Under Her Majesty's Royal Letters Patent.

DAGUERREOTYPE.

ROYAL GALLERY OF PRACTICAL SCIENCE, Lowther Arcade, West Strand.—Mr. CLAUDET is now taking Portraits and Groups of Figures at this Institution, upon a greatly improved plan; in addition to which, by a new application, Mr. Claudet is enabled, without any additional charge, to fix the Portraits, and render them so durable, that they will not fade or turn black. The state of the weather offers no impediment to the process; and parties are not expected to take their portraits unless perfectly satisfied with the likeness.—A performance on the new musical instrument, the Terpodion, daily, at half-past 3 o'clock.—Microscope, Pyreidotrope, Steam Gun, Electric Eel, Models, &c. &c.—Admission, 1s.; Children, half-price.—Open daily from half-past 10 till 6 o'clock.

FINE ARTS

NEW PUBLICATIONS.

We must now perform a task inevitably deferred while the ephemeral interest of the Exhibitions claimed our reports, and speak of the new prints, once again offering a few words on the prevailing style of engraving, which is anything but healthy or satisfactory.

What, for instance, must the lover of art say of Mr. Cousins's *Pets*, after Mr. Edwin Landseer's well known fancy-piece? When the work was exhibited at the Royal Academy, we questioned the admiration so loudly expressed on its behalf; and dared to ask for a little more of the simplicity of childhood, and a little less of blooming velvets, and trailing flower garlands. Meretriciousness, however, so largely belongs to colour, that in a black and white transcript we often find the corrupt exuberance of ornament to a certain degree purified. It is not so in the present instance. Mr. Cousins has yielded, with a willing hand, to the temptation which beset him. Vigour, indeed, could hardly have been given to a work so fatally pretty as the original picture, but here there is a lubricity of texture by which the eye is absolutely offended, until it turns with toleration in quest of some unfinished scratch of an etching, or some uncouth and primitive woodcut, where homely forms and plain combinations are rendered with as little consideration about effect, as the figures on the court cards of Mr. Creswick's gallery. With as much zeal as we employ to denounce these abasements of Art, do we welcome works of a more sterling or enduring character; such an one, for instance, as these *Engravings after the best Pictures of the Ancient Masters*; of which we have Part 3 before us: the subjects, the well-known Cartoon of 'Paul Preaching at Athens,' engraved by Dick; Claude's landscape of 'Eneas landing in Italy,' by Richardson; and the 'Conversion of St. Paul,' after Rubens, by Haig. The second of these engravings is the most satisfactory; though all three are clear of the meretricious graces of the time, which, indeed, if applied to the rendering of the masterpieces of eldern art, would amount to an offence little short of sacrilege.

Coming back to transcripts of more modern works, it is pleasant to commend such a print as Mr. Burnet's mezzotint from his own picture of the *Trial of King Charles the First*. The composition, if not first-rate, is artist-like and skilful: the drawing, if not vigorous, is easy, and not chargeable with glaring faults. Some feebleness there may be in the principal figures, made all the more observable when we recall the noble Vandyke portraits of the time; but, tried by the severest standards, the work is a good work, as a painting and as an engraving also. The lights and shadows are clearly marked, without hardness—the countenances are tenderly finished without smoothness—and buff coat and bandalier, royal mantle and regicide doublet, have each their own proper texture.

A fair, though not super-excellent, engraving, in the line manner, is Mr. Howison's large work, after the well-known *Polish Exiles* of Allan. Here the burin has erred, not so much from a wrong direction in search of the showy and superficial, but from timidity. There is a certain feebleness of tone, warranted, no doubt, by the original manner of the artist, observable,—especially in the draperies and in the horses. The peculiarities of Bashkir and Christian countenance are better rendered, and the print is altogether one of those deserving to be gathered to his portfolio by the intelligent patron of modern Art.

Mr. Brown's clever but somewhat hard mezzotint of *Philip the Second of Spain* and "Mary the Quene," after Sir Antonio More's picture, takes us back, with a vengeance, to the hard homely truths of Art in portraiture, which it is the object of the Granger Society to collect and perpetuate. Nothing here has been hazarded for effect—Queen and royal consort are equally repulsive; but to sourness and seriousness a life has been given, which makes them attractive: and we are not sure that the graces which have been gained by the Sir Antonios of the day, to whom the pictured fame of royal personages is committed, are counterbalanced by what they have lost in earnestness and fidelity.

While speaking of these admirable qualities exhibited at the expense of more engaging characteristics, the transition is natural to publications in which the plain truth and not the poetical version, is the thing set forth,—such, for instance, as Mr. Shaw's *Dresses and Decorations of the Middle Ages*, Nos. 10, 11, and 12. Here we have the realities of antique portraiture and costume,—Lydgate presenting his poems to the Earl of Salisbury; the bard in palmer's weeds, by way, it may be presumed, of conformity to the subject of his work 'Ye Pilgrime'—Occleve kneeling, on a like errand, to Henry the Fifth. Other groups awaken thoughts yet more picturesque, such as the Ladies playing on the harp and organ, from Vanni's picture of the Triumphs of Petrarch; or the very curious representation of Men Shooting at the Butt, from the *Imaginacion de vraye Noblesse*. Every specimen, in short, selected by Mr. Shaw, has its interest, which is increased by our knowledge of the prosaic truthfulness of hand which was religiously cultivated in the olden times. They might know little of perspective and trick of *chiaroscuro* who bordered the old missals and laboured the old *frescos* whence these valuable illustrations are chiefly derived, but they had a steadiness of aim and purpose, which has its charm, whatever be the task, and which gives even these stiff figures a worth as well as a curiosity. The seventeenth number of Mr. Shaw's *Encyclopædia of Ornament* is also before us. A step farther back, and which removes us from Art to Antiquarianism, brings us to Messrs. Waller's *Ornamental Brasses*, of which the fourth and fifth numbers are on our table. They are clearly executed, and with due attention to accuracy. With them may be noticed the four last numbers of Mr. Browne's *York Cathedral*, bringing that elaborate and valuable work to its thirteenth number.

Mr. Lupton adds another to the list of fine portrait engravings, in his mezzotint after Mr. Patten's portrait of *Mr. William Fawcett*. The likeness of this archimage of locomotions and all that pertains to the manufacture of *engine-ry*, is happily transferred from the picture to the paper; and the portrait is one calculated to have a wide circulation.

The twelfth and closing number of Heath's *Waverley Gallery* is the best of that publication. Its subjects offer great scope to the artists, as Mr. Drummond has found in painting Jeannie Deans, at the moment of her leaving the comfortable text in Reuben Butler's bible: we doubt much whether any one on this side of the Border could have done simpler and more honest justice to "douce David's" daughter. Lucy Ashton, too, as drawn by Mr. Parris, is very lovely—perhaps a trifle prettier, in the modish sense of the word, than the Lammermoor shepherdess really was; but we must not be over-strict. Mr. J. Hayter's Minna Troil, again, has a fine Siddonian head,—one of the best we have seen from his hand.

The publishers seem resolved, by their resolute and copious minuteness of illustration, "to put a girdle round the earth." But we cannot recommend these Views in *Affghanistaun*, "drawn in the tinted style" by Mr. Walton, after sketches made by Sir Keith Jackson, as among the happiest of those lithographic publications which have appeared in such a splendid line during the last half-dozen years. The first subjects are the most interesting; but there is great inequality in the execution. The views of Sukkar and Roree—to specify—are but a hair's breadth in advance of the old, coarse, and superficial lithograph. The heightening of body-colour in some of the darker subjects is carried to an extreme; and the effect of india-ink, endeavoured to be given in some of the masses of foliage and rock scenes, requires greater delicacy of hand than it has here found. Turning to a publication of a totally different scale and quality, we find some difficulty, at the moment, to remember into how many districts Mr. Bartlett has already wandered: but here he is, in a couple of publications, giving forth his agreeable and effective transcripts of towns and lakes and forests and "antres vast," a hemisphere distant from each other. One is the *Scenery and Antiquities of Ireland*, four parts of which are before us. Another is *Canadian Scenery*, now at its fifteenth number. We cannot but admire the fertility of so meritorious an artist, and the painstaking conscientiousness of the engravers employed on his drawings, whatever be our convictions as to the influence which such works are calculated to exercise on the well-being of art.—Mr. N. P. Willis, hardly less ubiquitous than the party whose Pencillings he illustrates, accompanies both works with letter-press, so light and lively, that it is by no means certain that some "rainy day" we shall not draw upon his gossip to eke out the deficient stores of our own. A work of similar class—less attractive, but we cannot help adding, more valuable—is Le Keux's *Memorials of Cambridge*, now at its fifteenth number.—The care with which every engraving is finished, deserves all possible honour: and the work is clear of those *ad captandum* tricks of light and shade, which distinguish books for the drawing-room table, from those whose place is the library shelf.

Mr. Frank Howard's *Lessons on Colour*, (Parts 1, 2, and 3) seem to us one of the most useful elementary publications of their class. The treatise to which they serve as illustration,—'Colour as a Means of Art,' was reviewed by us, some three years ago, (*Athen.* No. 557) and described as clever, but limited in its views. Though the present examples do not complete its deficiencies, they illustrate its principles, simply and clearly: and the student or amateur can hardly fail to derive benefit from seeing the effects of such colourists as Titian, Cuyp, Both, and Ruysdael analyzed.—Another book for the student's use, more limited in its scope, but of its kind excellent, is promised in this first number of Barnard's Studies of *Park Trees and Rustic Scenes*. As we have elsewhere remarked, these subjects, though speciously treated, often fail of real use, from a want on the part of the artist of an intimate knowledge of woodland anatomy; but here the several trunks and boughs of oak, and ash, and birch, and chestnut, are touched with as characteristic an exactness as their masses or wreaths of foliage.

By way of appendix to these paragraphs on illustrated books, periodically appearing, we may announce the fifteenth and sixteenth numbers of the *Ladies' Flower Garden*, by Mrs. Loudon, in which the fault already objected to, an over-crowding of the plates, is still too evident—and the twelfth number of Mr. Westwood's valuable and beautiful publication, the *British Butterflies*.

There but remain a single print or two of temporary interest to enumerate,—Mr. Duncan's engraving of Mr. Walter's picture of the *Niger Expedition*: another of Mr. Brierly's clever marine portraits of the *Hercules*, *Inconstant*, *Pique*, and *Castor*, lithographed, as usual, by Mr. Hawkins; a small lithograph of *Sir Francis Burdett*, by Mr. Lane; two lithographs of the restoration of the *Vicar's Close*, *Wells*, by Messrs. Dollman & Hawkin; and a bird's-eye view of the *Port of Corfu*, taken from the Citadel, by Mr. J. Cater.

In conclusion, we may announce that Mr. Wyld has just published *Maps and Plans* showing the principal movements, battles, and sieges in which the British army were engaged during the war from 1808 to 1814, from the original surveys by Major Sir T. Mitchell; Mr. Parker, *A Historical and Descriptive Atlas* of Scripture Geography; Mr. Knight, *An Illuminated Atlas* of Scripture Geography; and Mr. Ackermann, *An Embossed Plan of London*. This last is curious as a work of labour and skill; but we do not see what advantage is to result from it, unless it be intended for the instruction of the blind.

SEVENTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

[*From our own Correspondents.*]

THURSDAY, JULY 29.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

President—Rev. Prof. LLOYD.
Vice-Presidents—Rev. Dr. ROBINSON, Prof. CHRISTIE.
Secretary—Prof. STEVELLY.
Committee—Lord Adare, The Dean of Ely, Messrs. W. Chatfield, R. W. Fox, W. S. Harris, Capt. Johnson, R.N., Mr. F. Osler, Prof. Phillips, Mons. A. Quetelet, Mr. J. Scott Russell, Col. Sabine, Mr. W. Walker, Professors Whewell and Wheatstone.

On taking the chair, the PRESIDENT observed that it might be convenient to state briefly, for the information of those members who had not hitherto taken part in the proceedings, the nature of the communications which were about to come before them, and the manner in which it was usual to deal with them. These communications were of two distinct classes—namely, first, those which were called for by the Association itself; and, secondly, the uninvited, though welcome contributions, of individual members. The former of these classes includes Reports on the actual condition and future progress of some particular department of science, made by an individual member who is conversant with that department; as well as the Reports of Committees which have been appointed to consider the means of advancing some definite object of scientific research. These Reports are to be considered the peculiar property of the Association; they are made upon its demand, and the researches to which they relate are, in many cases, promoted by the aid of its funds. They will, consequently, be read at full length at your meetings, and will be printed at length in the Transactions. In the second class of communications, on the other hand, the Association claims no property whatever; and though the subjects to which they relate may receive their first announcement at its Sectional Meetings, yet their full development must be reserved for the halls of other Societies. It is desirable, therefore, that such communications should be presented in verbal outline; and that the time which may thus be saved should be reserved for those important oral discussions which have hitherto characterized our meetings, and which have often thrown a valuable light upon the questions at issue, and brought back the unguided wanderer in the unexplored regions of science into the true road of discovery.

'Report of the Committee for the reduction of Lacaille's Stars in the Cœlum Australe Stelliferum.'

Your Committee have to report that the Observations are reduced, the whole of the computations executed, and the arranged catalogue completed and delivered to Mr. Baily, to be employed in the construction of the extended edition of the Catalogue of the Astronomical Society. The expense has been much less than was anticipated. The exact sum will be reported officially by the Treasurer; but after defraying the further expenses incurred for computation labour, 76*l.* 15*s.*, and somewhere about 3*l.* for postage and stationery, a sum of about 100*l.* of the original grant will be found to remain unappropriated, and will not be required for the purpose for which the Committee was appointed.

Signed, J. F. W. HERSCHEL,
on the part of the Committee.

'Report of the Astronomer Royal on the publication of the Hourly Observations made at Plymouth, under the superintendence of Mr. W. S. Harris.'

1. The first series of observations of the thermometer extends from 1832, May, to 1836, December, containing readings of the thermometer for every hour of the day and night. The means of the readings are taken for each day; and for each hour the means for groups of ten or eleven days are taken.—2. The second series of observations of the thermometer extends from 1837, January, to 1839, December, and contains readings of the wet and dry thermometer for every hour of the day and night. The means of the readings are taken for each day.—3. The observations of the Barometer extend from 1837, January, to 1839, December, and contain readings of the barometer and attached thermometer for every hour of the day and night. The means are taken for each day.

I am not aware that there exists any such collection of regular, consecutive, and uniform observations. But I must beg that this my statement be received with caution, for the two following reasons: First, that I am little acquainted with the current literature of Meteorology; secondly, that I know nothing whatever of Mr. Harris's instruments, and especially, that I have no assurance either of the identity of the instruments through the series, or of the verification of their zero points; two matters of capital importance. Assuming, however, that the instruments have been the same, and properly verified, I have no hesitation in recommending that the observations be printed in full. And (considering that many of the purposes to which they may at future times be applied are yet unknown,) I do not see that any further deduction should be drawn, in the printed arrangement, than is drawn by Mr. Harris, except that I would submit for Mr. Harris's consideration, whether the means of the observations of several days, at the same hour, should not be taken for the second and third series, in the same manner as for the first.

G. B. AIRY.

Col. SABINE congratulated the Section on the advance this most important science was making in the accumulating store of facts. They were now in possession of other laborious meteorological observations carried on during the same period as that over which the researches of Mr. Harris extended, made in India under the patronage of the Rajah of Travancore, and those in Scotland under the superintendence of Sir D. Brewster.—Prof. WHEWELL adverted to the liberal spirit in which the Association was employing its funds, in bringing to light hidden treasures in the shape of observations, which, but for its assistance, must have lain buried and useless. Hundreds of thousands of observations had been made and recorded in successive years at the Royal Observatory. Those were now in progress of publication; and a similar remark applied to the observations made under the superintendence of Mr. Harris.

Prof. Whewell then delivered in Reports on the observations on the tides at Bristol and at Leith. The following are the more important passages in the several communications from Mr. T. G. Bunt.

Bristol, January 14, 1841.

As you requested me, some time ago, to suggest anything that occurred to me as worthy of further investigation in reference to the tides, I think it may be well to mention, that a few days ago I determined to try whether I could perceive any effect on the heights of high water here, produced by changes of atmospheric pressure. I accordingly arranged the errors of the calculated heights for 1840, in columns for every two-tenths of an inch of the height of the barometer, observed contemporaneously with the tide. The following was the result:—[From a diagram here given the average effect appeared to be about 15 inches depression of high water to 1 inch rise of mercury in barometer].—The consistency of these results leaves no doubt as to the fact of a sensible effect on the heights from this cause. Some subsequent trials gave nearly the same result, only a trifle *less* in the depression of high water for an inch rise of mercury. The specific gravities of mercury and water being not far (if I recollect right) from this ratio of 14 or 15 to 1, it would seem that the *total weight* of the compound column of air and water raised by the force which produces the tide, remains nearly unaffected by the changes of atmospheric pressure. By introducing this new correction, therefore, a very considerable portion of our *Residual Error* is accounted for.

February 9, 1841.

The barometric observations which I have used for finding the effects of atmospheric pressure on the heights of high water here, are those contained in the register kept at our Institution, which extends back to a period much earlier than the commencement of the tide observations which we have discussed, that discussion having commenced with January 1834.

February 18, 1841.

I send you diagrams of the effects of atmospheric pressure on the heights of high water, for every tenth of an inch height of the barometer, from 29.2 or .3 in. to 30.4 or .5 in., for the years 1834, 5, 9; barometer and tide contemporaneous. Also for the year 1834, barometer heights being 24 hours anterior to high water. Also for 1839, barometer 29.2, .3, .4, .5 in.,....30.2, .3, .4, .5 in., 12 hours anterior to high water. Also the mean of the three years, giving about 14 inches depression of tide, to 1 inch rise of barometer. I have also taken the sums of the residues left after introducing the barometer correction,—first, contemporaneously with high water; and secondly, at 24 hours anterior to high water, for the first six months of the year 1834, measuring the residue at about every high water. The total residues, in the two cases, were so nearly alike, as to leave it doubtful which epoch should be preferred. The diagram, for 1834, made from observations of the barometer 24 hours anterior to high water, appears about as good as the one from contemporaneous observations of barometer and tide. The extreme groups, however, for 29.2, .3, .4 in.,....30.4, .5, .6 in. barometer, approximate slightly towards the mean line; the same tendency appears in the double groups 29.2, .3, .4, .5 in.,....30.2, .3, .4, .5 in. for 1839, barometer observed contemporaneously with, and at 12 hours anterior to, high water. Hence I should be disposed to infer, that we do not *improve* the result by going back to an anterior epoch: for I take it for granted, that the true epoch is that which shows the greatest amount of elevation and depression of tide corresponding with the least and greatest heights of the barometer; or that which makes the greatest angle of inclination between the line connecting the several points or groups, and the axis.—There is one peculiarity which I have noticed in these barometrical results, and in others which I obtained in my earlier trials,—namely, that the effect produced on the heights when the barometer is at any point below 29.4 in. or 29.5 in., is always greater than the proportion for the greater heights of the barometer. I imagine this arises from the effect of *wind*, which generally follows a great depression of the barometer, and generally, with us, comes from the S.W.; so that an *additional* elevating cause comes into operation. This, however, is mere conjecture.

March 17, 1841.

I send you results of comparisons of the residues of height for 1834, 1835, and 1836, with the state of the barometer, at different epochs. The heights were calculated carefully by numbers, using what I consider to be my best corrections for lunar and solar parallax and declination, and employing the same corrections in each of the three years. The only correction omitted was that for the diurnal inequality. The residues for 1834 were compared with the barometer contemporaneous—12 hours anterior—24 hours anterior—24 hours *posterior*—and, the extreme groups, with barometer 36 hours anterior; in order to find what progressive changes of form the curves would thus be made to assume. The mean correction for 1 inch difference in height of barometer having been obtained, the proportional correction was applied to each observed height of high water, and the mean of all the errors, (remaining after the barometrical correction,) then taken for the whole year. In every instance the *contemporaneous* barometer gives the best correction. Thus, in 1834, the mean error remaining, after applying the barometrical correction, is—

5.817 inches Contemporaneous barometer.
6.085 ,, Barometer 12h. anterior.
6.221 ,, Barometer 24h. anterior.
6.248 ,, Barometer 24h. *posterior*.

These two latter epochs, the one *anterior*, the other *posterior*, producing nearly equal errors, seem to show, (like equal altitudes,) that the truth lies midway between them. In like manner, the mean residual error for 1835, is—

5.277 inches, Barometer contemporaneous.
5.421 ,, ,, 12h. anterior.
5.706 ,, ,, 24h. ,,

And for 1836:—

Error .....6.450 in. Barometer contemporaneous.
Do. .....6.535 ,, 24h. anterior.

The introduction of the correction for the contemporaneous barometer reduces the mean error *previously* remaining, about one-fourth, being as 1 : 0.753, for the whole of the year 1824; and as 1 : 0.705 for the year 1835. The mean effect on the tide corresponding to a change of 1 inch in the mercurial column, was carefully obtained, by taking into account the number of observations in each parcel, so as to get the true average. The contemporaneous barometer gives, in every instance, the greatest result; and in this case also, equal differences from the maximum attend the anterior and posterior epochs for 1834; viz. 11 inches tide (instead of 13.4 inches) to 1 inch of mercury. The mean depression of tide corresponding to 1 inch rise of barometer for—

1834 is 13.4 in. (Cont. Barom.)
1835 ,, 14.6 ditto.
1836 ,, 11.9 ditto.

Mean 13.3 for three years.

The mean of the several groups for each tenth of the barometer, in the three years, is shown in the last diagram, where the points approach much nearer than in any of the other diagrams, to a straight line. Is it not curious that the water is depressed by atmospheric pressure, almost exactly as much as it would be raised in the tube of a water-barometer? I suppose the next thing you would wish me to try, is, how far the correction curves of height for lunar and solar parallax and declination would have been different, had the barometrical correction been first introduced. I propose to go on with this next.

April, 1841.

I send you new correction curves made from the observed heights in 1839, after having *first* cleared them of the effects of the changes of atmospheric pressure, allowing 13½ inches of water to 1 inch difference in the barometric column. The greatest difference is in the solar declination curve, at the hour 6½h. of transit. I hardly think this can be entirely owing to the atmospheric correction, but most likely to some difference in the working out of the new lunar corrections, especially that for declination, with which the solar declination is almost inseparably mixed up, in any short series of observations. Indeed, I scarcely see how the effects of the two kinds of declination can be separated, with any certainty, about the hours of 0h. and 6h. transit, except by taking two sets of observations, the one having the moon's declination a maximum, and the other a minimum. Respecting the point on which you inquire,—viz. why I did not introduce the correction for diurnal inequality, as well as the other corrections, in seeking for the barometrical correction, my reason was, that the period of that inequality being so short, I assumed (perhaps too hastily) that it would pretty certainly compensate itself. My correction for that inequality, also, is the most imperfect of any of the corrections, and has never been employed by me, either on the sheets, or for my tide table, except in a few isolated cases.

'Report on the Discussion of Leith Tide Observations, executed by Mr. D. Ross, of the Hydrographer's Office, Admiralty, under the direction of Mr. Whewell.'

Although tables of the corrections of the height and time of high water due to lunar parallax and declination have already been obtained for several places (London, Liverpool, Plymouth, and Bristol), it is still desirable to correct and confirm these results by the discussion of observations made at other places, especially if continued for a considerable series of years. Our methods of discussion and tabulation may admit of improvement, and new features may appear in the new results. With these views I applied at the last meeting of the Association for the sum of 50*l.* to enable Mr. Ross to complete the discussion of a series of Tide Observations made at Leith, extending from 1827 to 1839 inclusive, and now including 1840. This long series of years is advantageous for the purpose of obtaining the declination correction; since, in consequence of the motion of the moon's nodes, the range of lunar declination and the mean declination is very different in different years; as was stated in my report on the subject, presented to the Association last year (*Athen.* No. 674). The present report will refer to a new mode of presenting the corrections of the *height* of high water for lunar parallax and declination. It has been shown by me in various memoirs, that the correction of the height, both for lunar parallax and declination, is nearly the same for all the hours of moon's transit. This being the case, the greater part of this correction may be expressed by means of a *table of double entry*,—the two arguments being the moon's parallax and declination. Mr. Ross suggested to me the advantage of such a table, and has constructed it from the Leith observations, and it is laid before the Association

along with the present report. It appears by this table, when separated into two parts, dependent upon parallax and declination, that the parallax correction varies very exactly as the parallax; and that the declination correction applicable to declination 0°, varies very nearly as the square of the declination; results agreeing both with those obtained from the Tide observations made at other places, and with the consequences of the equilibrium theory, modified as I have previously shown that it must be in order to express the results of observation. As I have stated, the principal part of the correction of the height of high water for lunar parallax, is constant for all hours of moon's transit. But there is a further term of this correction, though a small one, which goes through a cycle of positive and negative values, in the course of a semilunation. This has already appeared in the results of the London, Liverpool, Plymouth and Bristol observations, and also agrees with the theory above referred to. A like result appears in the results of Leith Tides by the discussions now reported, but at first sight with a remarkable difference. At Plymouth it appeared (Ninth Series of Tide Researches, Phil. Trans. 1838) that the correction for parallax is least when the hour of moon's transit is 10h., and greatest when the hour of moon's transit is 4h. or 5h., the mean parallax correction, when the part depending on the hour of transit disappears, occurs at transit 1h. and 7h. At Leith, on the contrary, the effect of the parallax is greatest when the transit is about 6h., least when the transit is 0h., and the mean value obtains, when the transit is about 3h. and 9h. But this great difference in the results, which at first appears to make the course of this correction nearly opposite at the different places, is, in fact, the result of the difference of the time which the original tide wave employs in reaching Plymouth and Leith. This correction varies nearly as the sine of the double angle of the moon from the sun, minus a certain epoch. Or, to be more exact, instead of the sine, we may substitute a circular function, which vanishes, and is positive and negative when the sine is, but which does not exactly follow the law of the sine. If this function be called S, the term of which we are now speaking is, in the Plymouth tables, as $S, 2\phi - 14h.$; in the Leith tables it is as $S, 2\phi - 18h.$ The difference of the epochs, 14h. and 18h., depends on the time of transmission of the tide from Plymouth to Leith. This is further illustrated by remarking, that in the results of London observations, this term is also represented by $S, 2\phi - 18h.$; while the Bristol observations give the term $S, 2\phi - 15h.$ The agreement of these results cannot but be considered as decisive evidence of the correctness of the tables which we have obtained, as to their form and general law; and this is the more remarkable when we consider how small are the results in which this coincidence is found. The coefficient of the term now spoken of is, at London, three inches; at Plymouth it is one inch; at Bristol, when the rise and fall is very great, this coefficient is six inches; at Leith, by the present discussion, its amount is found to be little more than one inch. The smallness of this term also leads us to this inference, that Mr. Ross's table of double entry may be used to obtain the corrections of heights for parallax and declination, almost without a sensible error. The table being obtained from Leith observations, will require a constant multiplier to adapt it to other places.

TABLES.

1. Mr. Ross's Table of the correction of Height for Parallax and Declination.

Declination Moons.	54½	55½	56½	57½	58½	59½	60½	61½
° °	in.							
0— 3	− 5.2	− 1.6	+ 2.3	+ 6.4	+ 8.7	+11.4	+17.5	+19.3
3— 6	5.6	1.5	2.7	6.8	9.7	12.2	16.4	20.4
6— 9	6.4	1.7	1.4	5.1	9.5	12.3	15.0	19.1
9—12	6.7	3.2	0.5	4.1	8.4	11.0	14.8	16.3
12—15	7.6	4.0	− 0.8	3.0	6.4	10.2	12.4	16.3
15—18	9.2	6.2	3.8	− 0.3	4.1	7.8	11.2	14.3
18—21	11.0	9.0	3.4	1.3	3.4	5.8	9.1	10.5
21—24	11.5	8.8	5.7	0.6	2.1	7.2	10.1	9.0
24—27	12.3	10.1	6.0	2.2	0.3	4.7	8.7	7.0
27—29	15.0	12.4	8.6	4.8	0.7	2.3	6.4	8.4

2. Table of the difference of the Parallax correction from the mean, for each hour of Transit.

0—30	− 1.7	− 2.0	− 1.2	− 0.4	− 2.9	+ 0.4	.0	+ 0.5
1—30	1.1	0.5	2.2	2.1	1.0	− 1.0	− 0.4	− 1.9
2—30	+ 0.3	0.7	1.6	1.1	.0	0.7	+ 0.5	
3—30	1.0	+ 1.1	+ 0.1	0.2	1.2	0.6	0.9	
4—30	1.1	1.3	0.9	+ 0.9	+ 0.6	+ 0.3		
5—30	1.1	1.5	1.0	1.8	0.8	0.2		
6—30	0.8	1.8	1.9	1.1	1.3	0.3		
7—30	1.3	1.1	0.4	− 0.2	0.6	0.9		
8—30	0.2	0.3	.0	+ 0.6	− 0.6	− 0.2	− 1.7	
9—30	− 0.3	− 0.8	+ 0.1	0.1	.0	+ 0.1	0.3	
10—30	0.9	1.3	− 0.7	− 1.5	+ 0.2	− 0.2	0.8	.0
11—30	1.8	2.5	0.4	1.1	0.8	+ 0.1	0.5	+ 0.5

3. The mean value of this difference for each hour of Transit.

− 1.6
1.3
0.6
+ 0.2
1.0
1.2
1.4
0.6
0.1
− 0.2
0.9
1.3

4. The mean value of this difference for each 3° of Declination. (Showing that the Declination correction is nearly as the square of the Declination.)

+ 4.2
4.5
3.6
2.5
1.3
− 0.9
2.7
2.9
4.4
6.0

5. The Semimenstrual Inequality of Height for Leith.

	0—30	1—30	2—30	3—30	4—30	5—30	6—30	7—30	8—30	9—30	10—30	11—30
1827	16 2	15 6½	14 8¾	13 10½	13 2½	12 9½	12 11⅜	13 10½	14 9	15 6⅝	16 0¼	16 3
1828	16 4¾	15 11	15 0¾	14 2½	13 5	12 11½	13 1⅝	14 1	15 0	15 9⅝	16 5	16 7¾
1829	16 3½	15 11	14 11¾	14 2	13 2½	12 9⅝	13 1⅜	13 11	14 9⅝	15 8¼	16 1¼	16 5¼
1830	16 3½	15 8¾	14 10½	14 0½	13 1½	12 9½	13 1⅜	13 10⅜	14 9⅝	15 7⅝	16 2½	16 5¼
1831	16 5⅜	15 9½	15 0⅜	14 2½	13 4½	12 11½	13 1	13 11¼	14 9	15 8¾	16 4	16 6¾
1832	16 1½	15 8½	14 10	13 11	13 1½	12 9	12 11¼	13 9⅝	14 7⅜	15 5	16 0½	16 3½
1833	15 11⅜	15 7½	14 9¼	13 11	13 1⅜	12 9½	13 0	13 9¼	14 8⅜	15 5⅜	15 11⅜	16 2
1834	16 1	15 7	14 10½	14 0½	13 1	12 7½	12 10⅜	13 8¾	14 8	15 6	16 0	16 3½
1835	16 0½	15 5½	14 8¾	13 9½	12 11½	12 6½	12 10¼	13 8½	14 8½	15 7¾	16 1⅜	16 2⅝
1836	15 10⅜	15 4	14 7½	13 10	13 0½	12 5½	12 11	13 8⅞	14 6½	15 4⅝	16 0	16 1¾
1837	15 9⅜	15 3	14 5⅜	13 6⅜	12 8½	12 2½	12 7	13 4⅜	14 6	15 3½	15 10	16 1
1838	15 8⅜	15 2½	14 6½	13 6½	12 8⅜	12 2	12 5⅜	13 2¼	14 3½	15 3½	15 9½	15 10½
1839	15 7½	15 2	14 4½	13 7½	12 7	12 2½	12 5⅜	13 4⅜	14 3	15 0⅜	15 8⅜	15 10½
1840	15 8½	15 4	14 7½	13 8½	12 9½	12 5½	12 8¼	13 4	14 4	15 2	15 8¼	15 10¼

Mr. WALKER stated it as a fact, to which his observation upon the tides of the port of Plymouth for many years had led him, that the sea uniformly rises before the barometer falls, and falls before it rises. He said he considered the hourly observations of the barometer, made at the dockyard under the superintendence of Mr. Harris, as important, as affording a means of investigating this effect of the pressure of the air upon the tides, to a degree of minute accuracy which could not be attained in any other port. He considered that the influence of the wind also should be noticed, and he suggested Malta as a peculiarly fit station for making and recording observations upon the effect of changes of the barometer, and of the winds, in altering the height of the sea, since the influence of proper tides was so trifling there.—Dr. ROBINSON directed attention to the importance of these and similar researches to the interests of such a nation as Britain, where so many lives and so much property were constantly dependent upon the knowledge of these matters possessed by the mariner when endeavouring to get into a secure port, in time of danger, through channels which can only be navigated at particular states of the tides. He concurred in the conclusion to which Prof. Whewell had come, that the epoch of the elevating or depressing influence of atmospheric pressure was contemporaneous with the tide.—The President, after some observations connecting the equilibrium theory of the tides with Prof. Whewell's results, said, that it occurred to him as remarkable that Daussy, in discussing the tides of Brest, and Lubbock in examining those of London, found a similar influence of the varying pressure of the atmosphere upon the tides; but as far as his memory enabled him to speak, they agreed in finding the amount only ten inches of rise or fall of the tide for each inch of fall or rise of the barometer; Prof. Whewell had found it about fourteen or fifteen, which was much more nearly that due to the relative specific gravities of water and mercury.

'Report of the Committee appointed to report how far the desiderata in our knowledge of the condition of the upper strata of the Atmosphere may be supplied by means of Ascents in Balloons or otherwise, to ascertain the probable Expense of such Experiments, and to draw up Directions for Observers in such circumstances.'

Although much valuable information might be obtained by means of aërostatic observation, the pecuniary outlay which would be required for this purpose is so considerable, that the Committee do not at present recommend any application of the funds for this object, much less any attempt to induce Her Majesty's Government to incur the expense, until the plan has been more fully matured. * * But experience derived from ascents made under ordinary circumstances, as opportunity may offer, would be desirable, both as regards the kind of instruments, the mode of using them, the special points to be attended to, the degree of concordance to be expected in results obtained at different times, places, and states of the atmosphere. The principal objects required are, to determine the progression of temperature, and the law of the distribution of vapour, in ascending from the surface of the earth to the upper regions of the atmosphere. There can be no doubt that, in a perfectly dry and undisturbed atmosphere of air, the temperature would be found to decrease as we ascend, as the density decreases; and that this must be its normal state to which, amongst all its fluctuations, it must tend. The decrease of density, however, is liable to the action of various disturbing causes, the principal of which are the evolution of heat by the local condensation of vapour, and its absorption by the evaporation of clouds. The law of the decrease would most probably be elicited from the mean results of a great number of careful observations, in which a compensation of such disturbances would take place; but it cannot be expected that it should be apparent in such a limited series as can be comprised in a single ascent. It is probable that the temperature observed at short intervals, instead of presenting a regularly decreasing progression, would exhibit great irregularities: as, for instance, that it would be found in a calm to decrease to a certain point, then become steady for a time, or possibly rise, especially upon passing through a cloud, or upon entering a current flowing in a different direction from that upon the surface: or, if the condensation of vapour were taking place from the action of a cold wind flowing into, and mingling with, a saturated atmosphere, instead of arising from the regular decrease of temperature due to the decreased density, a sudden and great depression would be found. The observer's attention should be particularly directed to the influence of clouds or changes of currents upon the thermometer. Mr. Green has found that the isothermal planes are parallel, or nearly so, to the earth's surface, so that the aëronaut knows generally, even although the earth may be intercepted by a cloud, when he is crossing a chain of hills; or at least the upper surface of the clouds generally follows in a great measure the configuration of the earth. "The upper surface of the clouds, upon occasions when they overspread the earth at a moderate elevation, seems to accommodate itself to all the variations of form in the subjacent soil." Mr. Green has also found that it is usual to ascend to a greater elevation to experience the same reduction of temperature when the earth is overspread with clouds than in a cloudless sky. According to Mr. Monck Mason, a singular relation is found to exist between the formation or precipitation of rain, and the condition of the sky above the clouds which contain it. "Whenever from a sky completely overcast with clouds rain is falling, a similar range of clouds invariably exists in a certain elevation above, whereby the rays of the sun are intercepted from the layer below; and on the contrary, whenever with the same apparent condition of the sky below, rain is altogether or generally absent, a clear expanse of firmament, with a sun unobstructed by clouds, is the prevailing character of the space immediately above; thus leaving it a determinate fact, that when rain is pouring from clouds overspreading the earth, the rays of the sun are not operating upon the clouds in question; while on the other hand, rain does not fall from such clouds when the rays of the sun are unobstructedly falling upon the upper surface." According to the same authority, and in conformity with the opinion of Mr. Green, it appears that in this country, whatever may be the direction of the wind below, in the higher regions, that is, generally within 10,000 feet above the surface of the earth, the direction of the wind is invariably from some point between the north and west. It appears from Mr. Green's observations that "the variation experienced in the course of the wind during the progress of the ascent was accompanied by a corresponding alteration in the intensity of its rate, the current which at the commencement was becoming strong as it took another direction, and *vice versâ*." These important facts in Meteorology could not have been ascertained by any observations made at the surface of the earth, and afford strong evidence of the advantages which might result to science from well-planned aëronautic expeditions. With regard to the atmosphere of vapour, it is probable that it tends to the maintenance of an analogous but very different progression of density and temperature, from below upwards, to that of the gaseous atmosphere; but being constrained to diffuse itself through the latter, it is controlled and regulated by the temperature into which it is thus forced. Thus the elasticity with which it will rise from the surface of the earth, in the act of evaporation, will be determined by the temperature of some upper stratum of the air, at which it will become condensed, the force at which point will limit by its reaction that of the evaporating surface. Between these two points, therefore, the dew-point will probably be found to be steady, or to decline by a very slow progression. After passing through the cloud, it may be expected that the dew-point will fall at once several degrees; the elasticity of the vapour on the upper side being probably governed and determined by a new point of condensation in still higher regions, just as the dew-point on the surface of the earth is conceived to be determined by the temperature of the first vapour-plane. This would imply, that while precipitation was taking place on one side of a bed of clouds, rapid evaporation might be going on upon the other. It is also conceivable that these processes of condensation and evaporation may be so adjusted as that they may exactly counteract each other; and the vapour-plane might thus be indicated by no cloud, or possibly by a mere haze; but the dew-point would fall suddenly. To this circumstance the observer's attention should be particularly directed. It is probable that, in ascending to a great height, several vapour-planes might be thus crossed, and the confirmation of the hypothesis would be of importance to science in elucidating the constitution of the atmosphere. It is obvious that, for the purposes just indicated, the observations of the thermometer and dew-point should, if possible, be unremitted during the whole time both of the ascent and descent, and, of course, must be accompanied by simultaneous observa-

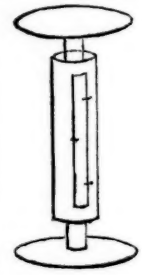
tions of the barometer: one person's time should therefore be wholly devoted to these objects; and the arrangement should be well considered, by which his labour may be facilitated and his attention kept undistracted. The prevailing forms and structure of the clouds; their internal motions, if any; the number of strata which may be detected, and the number and direction of the currents which their motion may indicate, will also form interesting objects of observation in conjunction with the preceding. Cotemporaneous observations will, of course, be made on the earth during the time of the aërostatic voyage, which will possess a greatly-increased interest if circumstances should permit it to take place on the day when hourly meteorological observations are made at all the principal observatories of Europe, according to the plan laid down by Sir J. Herschel. Portions of the air should be brought down, for examination, from the highest elevations: and this may probably be best effected by taking up several glass balloons, or bottles carefully gauged, fitted with stop-cocks, and filled with water. The water should be allowed to run out at the proper station, and the stop-cocks closed. Experiments upon the radiation of heat, by another observer, would also be interesting, although there are probably no known means of instituting them with all the accuracy which could be desired. Observations with Sir J. Herschel's Actinometer might be made upon the force of solar radiation at various heights; but the instrument would not be applicable to the measurement of terrestrial radiation. When a delicate thermometer, whose bulb is covered with lamp-black, is placed in the focus of a parabolic reflector, and turned towards the clear sky, even in the day-time, it will radiate a portion of its heat into space; by the same contrivance, the rays of heat proceeding from the earth, or from beds of clouds, would be condensed upon the thermometer, and some estimate formed of their intensity. Observations upon these points at different heights, and at different periods of the day and night, would be instructive, though not of the high importance which would belong to those of the thermometer and hygrometer. To these observations might be added others of great interest upon the electricity of the atmosphere, by dropping wires into clouds, or from stratum to stratum of cloudless air, and examining the nature of the electricity of their extremity by means of a very delicate electroscope: but attractive as these researches may prove, the Committee recommend, that should a series of ascents be undertaken by one or many observers, on no occasion should the observer's attention be distracted by too great a variety of objects; and that our efforts should at first be directed solely to the elucidation of the question of the decrease of temperature, by the acquisition of accurate contemporaneous observations of the barometer and thermometer made at different elevations. It would manifestly be desirable, that while observations of atmospheric temperature and pressure were made in a balloon, two observers, stationed at the extremities of an accurately measured base, and provided with theodolites of the best construction, should by their observations determine the height of the balloon geometrically, at the instants the observations of temperature and pressure were made. This, however, implies a more extensive system of co-operation, and a larger personal and instrumental force than could probably be assembled. It will, therefore, be best to confine the observations simply to the determination of corresponding temperatures and pressures of the atmosphere. For this purpose nothing more is wanted than a supply of instruments that can be easily used and give accurate results.

Of the Hygrometer.—It is desirable that two hygrometers should be provided, which may be fixed side by side upon the lid of a box, into which they may be contrived to pack. The observer should not only note the temperature of the first appearance of dew, but the temperature at which it again disappears; and while he is waiting for the last observation by one instrument, he may proceed to make a new one with the other. A store of the best æther should be provided, and a convenient dropping-bottle. No disadvantage would arise from the effect of the diminished pressure upon the boiling-point of the æther, if placed in a bottle contrived for the purpose; as thus,

a b the bottle,
c d the level of the æther,
e f a tube fitted tight into the neck, and passing to the bottom of the liquid, furnished with a stopcock *c*. As the atmospheric pressure diminished upon the aperture of the stopcock, the pressure of the included vapour would pour out a stream of æther, which might be regulated, and the rapidity of its subsequent evaporation would be a great advantage; but as it is probable that the dryness of some of the upper sections of the atmosphere may be extreme, smaller tubes, filled with condensed sulphurous acid, should be provided, and kept cool in ice, by the dropping of which upon the bulb of the hygrometer extreme cold may be produced. As an additional precaution, a small bright silver capsule and delicate spirit-thermometer may be prepared, by which the dew-point may be observed from the direct evaporation of the acid. Bottles containing a mixture of liquid carbonic acid and æther might perhaps be prepared, which would answer the purpose still more perfectly. As it is extremely desirable that the relation of the cold produced by evaporation from the surface of a wet-bulbed thermometer with the dew-point should be ascertained, and as such an observation would not add much to the trouble of the observer, Dr. Mason's hygrometer, which is a convenient form of the instrument, may be fixed upon a stem upon the box, immediately behind the hygrometers, and the temperatures of the two thermometers may be noted. The freezing of the water in the upper regions will, however, put an end to these observations. The stem which supports the thermometers may also be made to carry a moveable card-board, covered on the outside with gilt paper, so as to screen all the instruments from direct radiant heat.

Of the Barometer.—The only barometer that can be used, and can be *trusted* in observations like those in question, appears to be the Siphon barometer of Bunten, in Paris (Quay Pelletier, No. 26), or barometers of a similar construction by Robinson, of London. The tubes of Bunten appear to be carefully made; the column of mercury is easily seen; and the slow motion of the verniers, though not so fine as in Robinson's, is more easily managed, a circumstance of some importance in the present instance. The barometers should be new: their scales divided in millimetres only. Some of them have a scale of English inches, which, owing to some mistake about standard temperature, is very erroneous. They should be always kept inverted, except when in actual use. When allowed to hang in the position in which they are used, the mercury in the short tube becomes oxidized, the glass covered with a powder of the oxide, and the capillary depression considerably increased, which renders the instrument useless. In a cistern barometer, where the level of the mercury cannot be observed, the corrections for a change of level for *small* variations of barometrical pressure are extremely troublesome. For *large* changes of barometrical pressure they must become uncertain in the highest degree. Troughton's mode of determining the lower level is decidedly bad. The cistern barometers, in which the lower level is determined by contact of a point with the surface of mercury, are good *comparative* or *differential* instruments, but nothing more.

Of the Thermometer.—The best and most convenient thermometers appear to be those made by Greiner, of Berlin, with a paper scale enclosed in an outer tube, on a scale of milk-white glass. The bulbs are exposed, and the scales cannot be injured by immersing the bulbs, or whole instrument in water, or any other liquid, for purposes of comparison. The graduation should extend from −35° Fahr. to about +104° Fahr. In Gay-Lussac's ascent, the thermometer descended 40° 25′. It is not likely that any observers would ascend much higher than he did, or that they would undertake an ascent when the temperature at the earth's surface was less than 10° C. The thermometers, during the ascent, should be enclosed in bright tin tubes (having an opening through which the scale can be observed), open at both ends, with a round disc of tin at a little distance from the ends, to prevent the effect of radiation. Thermometers thus protected were used at the Cambridge Observatory, and found to answer well. The temperature of the air being already known, one thermometer with a wet bulb will be sufficient to determine the pressure of vapour at a given station.



Directions for Observing.—When the motion of the balloon in a vertical direction appears to be small. 1, Observe the thermometer attached to the barometer. 2, Make the lower edge of the upper ring appear to touch the upper end of the mercurial column. 3, Make the lower edge of the lower ring appear to touch the lower end of column. 4, Observe the thermometer in the tin case for temperature of air, and note the time. 5, Read off the two verniers of the barometer. 6, Observe the psychometer and Daniell's hygrometer. The observations at the surface of the earth should be made in the same order. The observers should avoid approaching the thermometer and barometer as much as possible, in order that they should not influence the temperature. The aëronaut must be instructed in making the contact between the ring and the end of the mercurial column, also in reading a vernier correctly.

Cost of Instruments.

Two of Bunten's barometers, each 4*l.* 8*s.*.....	£8 16
Duty, 25 per cent.....	2 4
Two thermometers, each 1*l.* 11*s.* 6*d.*.....	3 3
Duty, 25 per cent.....	0 16
Same, to be used with wet bulbs	3 3
Duty, 25 per cent.....	0 16
	£18 18

Tin cases for thermometers, Daniell's hygrometer, &c.

It would be manifestly imprudent to commence operations with only just a sufficient stock of such fragile instruments as barometers and thermometers. Duplicates of every one should be provided. This would make the cost of the instruments amount to about 50*l.* To the above might be added,—a sympiezometer, constructed for the purpose, *without* sliding scale,—a maximum and minimum thermometer, about as large as a watch, constructed by Breguet.

(Signed,) DAVID BREWSTER,
J. F. W. HERSCHEL,
J. W. LUBBOCK,
T. R. ROBINSON,
EDWARD SABINE,
W. WHEWELL.

Dr. ROBINSON felt some difficulty in respect of this Report, although his name appeared among those signed to it. As far as it went, it was unexceptionable, but he felt dissatisfied with the apparent despondency of its tone. The able chairman of the committee whence it proceeded, has shown most clearly the magnitude and importance of the conquests to be achieved in this almost unexplored domain; he has shown with equal distinctness the difficulties of the task, but he has not displayed an answering measure of determination to subdue them. Great as they may be, they do not surpass those which a few years since seemed to beset the field in which our illustrious President has reaped some of his brightest laurels. The theory of the tides was supposed a hopeless maze, in which the greatest masters of science had lost their way; but by unwearied energy, by patient labour, enlightened by consummate knowledge, he had won the treasures which it concealed, one of which this morning has commanded the applause of the members. It may not be possible to effect for the ocean of air what Mr. Whewell has done for that of water, but the attempt should be made, and would in all probability be rewarded. If unsuccessful, even the failure ought to be regarded as an addition to our knowledge. With respect to an examination of the higher regions of the atmosphere by aëronautic voyages, he fully concurred in the opinion expressed by the Report. The result of the celebrated ascent of Gay-Lussac was sufficient to justify that; it was made with the means afforded to the institution by the unsparing liberality of Napoleon, but it was not repeated; a proof that he himself did not consider it of much value. His allusion to the difficulties of observation under such novel conditions, and the discordant laws which Biot, Sir J. Lubbock, and others of less authority, have deduced from this ascent, show that there must have been powerful causes of error in action. But the Report takes no notice of the method by captive balloons, though used both for military reconnoissance and geodetic operations. It has been often recommended by Arago, and even tried in Britain. If the range of investigation be limited, our knowledge of the physical constitution of the atmosphere is much more so. An additional motive for these researches is presented by the fact, that a valued Associate, Capt. James Ross, is ready to co-operate with them in those Antarctic regions where his adventurous quest will bear him. Such an opportunity may never occur again, and it appears a case not unworthy of the aid of the Association.—Dr. Robinson said he had reason to believe that Government would permit the experiments to be made at Woolwich, and with the aid of Colonel Sabine, and the refined means of observation suggested by Prof. Wheatstone, he felt confident that valuable information would be obtained; were that the case, and further and more powerful means of research requisite, he was equally confident that it would not be denied by Government.

—Prof. WHEWELL agreed with Dr. Robinson, that the tone of the Report was too desponding: for his part he had no idea that the expense would be such as to interfere with this most important investigation; indeed, it had been ascertained that the Government, with that spirit which should ever characterize the conductors of the affairs of this great nation, had expressed a willingness to send the necessary apparatus to Capt. Ross, in order that he might explore the upper strata of the atmosphere, as soon as they should have the assurance of competent scientific authorities, that the object was important, and these means were likely to attain the desired end: also that proper apparatus would be provided at Greenwich, and placed under the superintending care of Colonel Sabine, as soon as a similar guarantee had been obtained.

'On the Theoretical Computation of Refractive Indices,' by Prof. Powell.

In the Report on Refractive Indices which the author had presented to the Association (*Athen.* No. 461) his professed object extended only to exhibiting the results of *observation*, without any reference to *theory*. That the comparison of these results with theory is highly important is indeed manifest; and the necessity for it is dwelt upon (in reference to the Report just mentioned) in the address of the General Secretaries at the meeting of 1840. It would, however, (on several grounds) have been foreign to the design of that Report to have introduced the subject of *theoretical* computation. The author has since that period been devoting his attention to this latter subject; and it is the object of the present communication to state very briefly the progress made in it. The results in the Report on Indices are classified under three heads: 1st, those of Fraunhofer; 2nd, those of Rudberg; 3rd, those derived from the *latest* observations of the author, comprising many *new* results, *superseding* former ones, and others, the combined results of several sets of earlier observations compared with later. The 1st series was compared with theory, 1st, by the author in the Phil. Trans.,

1835, but only by an approximative and tentative method: 2ndly, by Mr. Kelland, by a direct and exact method in the Camb. Trans. vol. vi.: 3rdly, for the rays D and C only, by Sir W. R. Hamilton, in the Phil. Mag. 3rd Series, vol. viii.; 4thly, by M. Cauchy in the Nouv. Exerc. livr. 3—6, by a most exact and elaborate process. The 2nd series has been computed only by the author, by the same approximative method as the 1st, in the Phil. Trans. 1836, whence it was reprinted in Poggendorf's Annalen. Some of the first results belonging to the 3rd series were computed by the author, by Sir W. R. Hamilton's method, in the Phil. Trans. 1837, and three of the higher cases, in which discrepancies appeared, were recomputed by Mr. Kelland's method in the Phil. Trans. 1838. Thus it was desirable to recompute series 2, by an *exact* method, and necessary to calculate all the *new* and *improved* results of series 3. This, the author has now done, by means of Sir W. R. Hamilton's formula, and for the sake of uniformity, has included series 1. The results agree perfectly with observation, *except in the most highly dispersive cases.* But here it is found that if an *empirical change be allowed in one of the constants* for each medium, a sufficiently close accordance is obtained.

'On the Refraction of Heat,' by Prof. Powell.

In a short communication to the Physical Section of the British Association, 1840 (*Athen.* No. 674), the author alluded to that singular result of the undulatory view of dispersion—the existence of *a limit to all refraction* in each medium, at no very great interval below the least refrangible end of the visible spectrum; and suggested the comparison of observations on the refraction *of heat* with this conclusion. He has since followed up that suggestion, in reference to the only medium as yet examined, in which it is practicable to compare the refractions of light and of heat, viz. rock salt. In his Report on Radiant Heat (*Athen.* No. 674) he has stated Prof. Forbes's indices for the different kinds of heat, corrected according to the Professor's own suggestion from the approximate form in which they were at first given. The proposed correction, however, allows of some latitude; and, on reconsideration of the subject, as before stated, it appears to the author most fair to take Prof. Forbes's result for light as obtained with the Locatelli lamp. This corrected by $-.04$, gives for the mean light $\mu = 1.558$, which agrees sufficiently with the author's own observations conducted by a totally different method (see Report on Refractive Indices, 1839). With the same correction the extreme index for the *least refrangible* kind of heat is $\mu = 1.528$. By *theory* the author has computed the value of *the limiting index* above mentioned, and finds it to be $\mu = 1.5277$, also the index for a mean ray of heat whose wave length is .000079 inch, is found to be $\mu = 1.529$. Considering that Prof. Forbes allows some uncertainty in his results, this affords a very satisfactory confirmation.

'On certain Points of the Wave Theory of Light,' by Prof. Powell.

At the Birmingham meeting of the British Association the author offered a short communication (*Athen.* 620) relative to certain difficulties connected with the equations of motion on which the wave theory is now founded, which had given rise to some controversy. Since that time, however, he conceives the main difficulties have been completely cleared up; and it was his endeavour to put the chief part of the subject, in this elucidated point of view, in a paper in the Philosophical Mag., March 1841, and he has since been engaged in embodying these and other points in a separate work. The whole theory of the dispersion is referred to the primary equations of motion, originally suggested by M. Navier, agreeably to the principles of M. Cauchy, since improved upon by others. The forms assumed by these equations, in connexion with the symmetrical or unsymmetrical arrangement of the etherial molecules, have a direct relation to the occurrence of rectilinear or elliptic vibrations, a distinction first pointed out by Mr. Tovey. When the arrangement is symmetrical, the existence of axes of elasticity (discovered by Fresnel), as well as the general investigation of the wave surface, has been shown by Sir J. Lubbock to be deducible from the same primary equations; and the difference in form between the wave-surface-equations of Fresnel and of Cauchy is traceable to differences in the form of the same equations. (A synopsis of the principal formulæ referred to accompanied the paper.)

Section B.—CHEMISTRY AND MINERALOGY.

President—Dr. Daubeny.
Vice-Presidents—Prof. Daniell, Col. York.
Secretaries—Messrs. J. Prideaux, W. M. Tweedy, R. Hunt.
Committee—Messrs. R. Were Fox, W. A. Miller, R. Porrett, E. A. Parnell, J. Tennant, Dr. Armstrong.

In the absence of Dr. Daubeny, the chair was occupied by Col. York.

'On the Influence of the Ferro-Cyanate of Potash on the Iodide of Silver, producing a highly sensitive Photographic Preparation,' by Mr. R. Hunt.

The author being engaged in experiments on that variety of photographic drawing which is formed by the action of the hydriodic salts on the darkened chloride of silver, with a view to the removal of the iodide, formed by the process, from the paper, was led to observe some peculiar changes produced by the combined influences of light and the ferro-cyanate of potash. He found that the ordinary photographic paper, if allowed to darken in sunshine, and then slightly acted on by any hydriodic salt, and washed, when dry, with a solution of the ferro-cyanate of potash, became extremely sensitive to light, changing from a light brown to a full black by a moment's exposure to sunshine. Following out this result, it was discovered that perfectly pure iodide of silver was acted on with even greater rapidity, and thus it became easy to form an exquisitely sensitive photographic paper. The method recommended is the following:—highly glazed letter paper is washed over with a solution of one drachm of nitrate of silver to an ounce of distilled water; it is quickly dried, and a second time washed with the same solution. It is then, when dry, placed for a minute in a solution of one drachm of the hydriodate of potash in six ounces of water; and, being placed on a smooth board, gently washed by allowing pure water to flow over it, and dried in the dark at common temperatures. Papers thus prepared may be kept for any length of time, and are at any moment rendered far more sensitive than any known photographic preparation, excepting the Calotype, which it quite equals, by simply washing it over with a solution formed of one drachm of the ferro-cyanate of potash to an ounce of water. These papers may be washed with the ferro-cyanate, and dried in the dark: in this dry state they are absolutely insensible, but they may at any moment be rendered sensitive by merely washing them with a little cold water. The paper is rendered quite insensible by being washed over with the above hydriodic solution, and from the photograph thus fixed many copies may be taken. The author then described the action of the spectrum on this preparation, and pointed out that the greatest effect was produced by the least refrangible rays; but that all the rays, excepting the *extreme red*, acted with considerable energy. The impressed spectrum was, in all cases, distinctly coloured from end to end; and it was found that the colours of superposed media left a corresponding tint upon the paper, but, unfortunately, as the paper dried, the colours faded. These results bring nearer the probability of being enabled to produce eventually photographic pictures in their native colours. The spectra formed on these papers were all surrounded by a marked space, which was protected from the influence of the dispersed light, exhibiting another proof of the fact noticed before, by Sir John Herschel and the author, that a class of rays having peculiar negative properties emanate from the edges of the sun. Some spectra and numerous specimens of these drawings were exhibited.

'Some Researches on the Developement of the Electrical Force, and an Inquiry into the Nature and Properties of the New Element or product of Electrical Action described by Schönbein,' by Mr. F. De Moleyns.

The statements made by Prof. Schönbein at the Glasgow meeting (*Athen.* No. 674), respecting the production of a new element, which he called ozone, attracted the attention of Mr. De Moleyns; and the paper now read contained some of the more important results of his experiments. In the report alluded to, Prof. Schönbein stated, that the disengagement of the "odorous substance" depended,—1st, Upon the nature of the positive electrodes; 2nd, Upon the chemical constitution of the electrolytic fluid; and, 3rd, Upon the temperature of that fluid. He added, that his experiments went to show that well-cleaned gold and platina were alone capable of disengaging the odoriferous principle, and that the *more easily* oxidable metals, as well as charcoal, did not possess that property at all.—The results of Mr. De Moleyns' investigation appeared to prove,—1st, That the disengagement of the peculiar odour was not confined to the *less easily* oxidable metals; 2nd, That by certain arrangements, *all metals*, when positive electrodes, may be made to develope the odoriferous principle; 3rd, That certain positive metals, not acting as electrodes, will evolve this principle; 4th, That charcoal forms no exception to this rule; 5th, That all substances, whether crystalline in structure or otherwise, possessing the property of appearing luminous by friction, or of yielding sparks when struck, also possess the property of discharging, under such circumstances, the peculiar odour; 6th, That iron and nickel develope this principle more strongly than any other metal. Mr. De Moleyns, observing the odour to be produced at the points connecting an electro-magnetic machine with the battery, constructed an apparatus by which magnets were made to revolve within a glass cylinder, which could be exhausted at pleasure, or filled with various gases; by such means he obtained a vacuum, and operated in *dry* air, collecting the matters evolved over distilled water, and by such modes he proved that ozone could not only be produced in a dry atmosphere, but also in a vacuum—mercurial and common. These and other experiments led Mr. De Moleyns to the conclusion, that the ozone of Schönbein, which he proposed to name Electrogen, must be admitted into the list of supposed elements: that it was *not* an anion of an electrolytic compound whose cation was *unknown*: and that probably it existed in combination in various forms of matter, which at present are considered, but which in reality are *not*, elementary.

Section C.—GEOLOGY AND PHYSICAL GEOGRAPHY.

President—Mr. De la Beche.
Vice-Presidents—Marquis of Northampton, Prof. Sedgwick, Rev. Dr. Buckland, Rev. Mr. Conybeare.
Secretaries—Messrs. W. J. Hamilton, R. Hutton, E. Moore, M.D.
Committee—Mr. R. H. Bright, Rev. D. Williams, Messrs. J. Phillips, R. Hutton, H. E. Strickland, Rev. R. Hennah, Messrs. R. Taylor, jun., C. Bartlett, J. Carne, R. Austen, L. Horner, J. Yates, W. Sanders, J. E. Bowman.

A paper was read 'On the Upper Silurian Rocks of Denbighshire,' by J. E. Bowman.

The author commenced by referring to a paper on the Upper Silurian Rocks of the Vale of Llangollen, read by him at the Glasgow Meeting (*Athenæum*, No. 674), and by stating that a partial re-examination of this district, and a survey of that large portion of Denbighshire which lies between the Vale of Clwyd and the river Conway, during the present summer, have afforded him additional proofs of the soundness of the arrangement he then proposed, and shown that it is applicable to the whole of Denbighshire, notwithstanding some farther new appearances still more difficult to reconcile with the typical series of Mr. Murchison. The lofty hills on both sides the great valley of the Dee as high up as Corwen, and all the county of Denbigh west of the Vale of Clwyd, except the hills of carboniferous limestone which accompany the upper beds, consist altogether of upper Silurian rocks. On account of the absence of the Aymestry and Wenlock limestones, the changes of structure, and the alterations produced by cleavage, Mr. Murchison's subdivisions could not be adhered to. The author, therefore, proposes to arrange the Denbighshire series in the following descending order:—

Upper divis.
1, 2, and 3. Green and red sandstones and marly conglomerates, with fossils of the Ludlow rocks. Thickness, 100 feet.
4 and 5. Blue argillaceous schists, variously affected by cleavage, rarely containing fossils of the Ludlow rocks. Thickness, 1,000 feet.

Lower division.
1. Thin beds of hardened schist, without cleavage or fossils. Thickness, 600 feet.
2. Parallel beds of blue or grey argillaceous shales, alternating with others of lighter colour, giving a streaked or banded character to the section. Unfossilliferous—horizontal. Thickness, 1,500 feet.
3. Coarse slates and flags, with large Orthocerata, &c. Cleavage nearly coincident with the bedding; often wanting. Lowest beds green, lying upon the lower Silurian rocks. Thickness, 1,600 feet.

Total thickness of the Denbighshire Upper Silurians, 4,000 feet.

Upper division, 1, 2, 3.—These beds are interesting,

as containing, under the garb of the old red sandstone, the fossils of the upper Ludlow rock; and the more so, since the old red sandstone itself is entirely wanting in North Wales, its nearest point to the beds in question being the outliers of Clun Forest, at the distance of upwards of sixty miles. 4 and 5—These beds are the true equivalents of the upper Ludlow rocks, and generally do not differ much in appearance from the Shropshire type. Though, for the most part, very barren of fossils, *Terebratula navicula*, &c. have been found in a few localities. They are often affected by strong cleavage, resembling some lower Silurians, and, however long exposed, usually retain their hardness and colour. A striking proof of their durability occurs in the bed of the Dee, under Llangollen Bridge, whose piers rest upon the native rock in the stream. This bridge was built in 1346, yet, after the lapse of five centuries, the bed of the river is not now more than a foot below what was then its ordinary level. Beds of this age form a broad belt to the south and west of the carboniferous limestone range, and cap many hills of the lower division, north and west of the river Elwy.

Lower division, 1.—These thin, and apparently siliceous schists, occupy the beds of the Dee and the surrounding hills above Llangollen, and insensibly graduate downwards into the next, or middle portion. —2. These parallel argillaceous shales are of great thickness and extent, and may always be recognized by their streaked or banded appearance, nearly horizontal position, by the rare occurrence of cleavage, and total absence of fossils. Where the beds separate freely, they form good building stones. This section is extensively developed in the hills on the south bank of the Dee, between Llangollen and Corwen, and in a large portion of Denbighshire, west of the vale of Clwyd.—3. Slates and flags. This is by far the most important and valuable portion of the North Wales Silurians, since it contains numerous quarries, that are extensively worked in the hills north and south of the vale of Llangollen, and in the district between the rivers Clwyd and Conway. They are not, however, so durable as the true Carnarvonshire or Cambrian slates, becoming brown and rotten on long exposure, like the "mudstones" of Shropshire, of which they are proved to be the equivalents, both by their place in the general section, and by the large Orthocerata and Cardiolæ found upon the surface of some of the flags. The lowest beds rest upon true fossilliferous lower Silurian rocks.

In the chain of hills north of the great Holyhead road, between Cerrig y Druidion and Pentre Voilas, rocks of this section assume a new and very peculiar character. They consist of numerous streaked beds of soft ferruginous schist, which soon crumbles down into small fragments, and of intermediate beds of hard amorphous greywacke, ten or twelve feet thick, and several hundred feet apart in the upper portion of the series, forming the summits of the hills, and gradually diminishing in thickness downwards. Collectively, they cannot be less than 1,200 or 1,400 feet thick. As they occur on the confines of two great centres of volcanic eruption to the south and west, and as the beds along their whole line are everywhere thrown off from one or other of these centres, the author supposes that the greywacke beds have been formed by the mixture of volcanic ashes with the sedimentary deposits; and that after consolidation, the schists have been altered by long contact with heated matter, which, in its struggles to escape, has first upheaved, and then burst through the surface; those portions which covered the immediate seat of the eruption having been altogether swept away, and the hills in question forcibly tilted aside. This altered character gradually disappears to the eastward of Cerrig y Druidion. All the lower division of the Denbighshire upper Silurians is remarkable for the singular uniformity, parallelism, and streaked appearance of the beds—for their freedom from twists and curvatures and from cleavage—for their low angles of inclination, and for the general absence of organic remains. Their total thickness is estimated at 3,700 feet; and their parallelism and freedom from contortion through so great a depth, are attributed to the cessation of subterranean disturbances through a long-continued epoch—a fact that would scarcely have been suspected at so low a point in the scale of the sedimentary deposits. The streaked character is supposed to be due to a slight admixture of felspar in some of the beds, which, on weathering, acquires a paler hue, and which may have been derived from some distant vent, and diffused through the waters. Only one instance was met with of the beds being thrown up into high angles. This was in the rugged district between Llangollen and the head of the vale of Clwyd, near the north-east end of the Berwyn range, and exactly in the common line of strike of that and of two other independent mountain chains. Here they converge as to a focus, and appear to have been upheaved by so many distinct masses of pent-up elements in their struggles to escape, which, meeting in a common centre, have, by their combined forces, effected this tremendous convulsion. The rocks are thrown into inconceivable disorder, the beds dipping at all angles. Along the whole extent of one mountain, 1,200 feet high, and above half a mile long, they are absolutely perpendicular, and seem to have been rifted and tossed on end in one entire mass. It is in the midst of this scene of devastation that the Dee "winds her wizard stream" through the vale of Llangollen; but the harsher features are worn down, and concealed under the green slopes and hanging woods which compose the rich scenery of this celebrated spot.—The author then compared the Denbighshire upper Silurians with their soft equivalents, the "mudstones" of Montgomeryshire, and shows their connexion by instances of rocks of similar age, but of an intermediate character, from other localities. The chief difference is in the lower division. The same species of fossils occur in the contemporaneous beds of each portion in both districts, and in the same geological sequence, but very sparingly in Denbighshire; also the same general parallelism and low angle of dip; the same character of the jointed structure; and the same tendency to concretions, both in beds and in detached ballstones.—The paper concluded by showing, from the altered appearance of the upper Silurian group in North Wales, compared with those of Shropshire, the still greater differences that may be expected to occur in distant countries; that little or no stress can therefore be laid on mere lithological structure; but that, as beds of the same age, in widely-separated regions, are found to contain some fossils that have a common type, and are identical in species, the study of organic remains should be considered as of paramount importance by the practical geologist.

Mr. De la Beche referred to the similarity in mineral structure of these rocks below the mountain limestone to the old red sandstone, whilst their fossils were characteristic of the Silurian system: and observed, that as lithological character depended upon the operation of physical causes, whilst fossils were important in determining the relations of strata, general principles were involved, of great value and interest, in the question under discussion.—Mr. J. Phillips remarked, that some systems of rocks might be characterized by mineral structure and their relation to rocks of igneous origin, and in other districts organic remains afforded indications of their age: he wished great caution to be exercised by local geologists in estimating the value of these characters. Such general rules must be founded only on observation; and it was necessary to determine the exact relation of these particulars in order to ascertain the distribution of mineral masses of a certain age. The division of strata, if made to rest upon lithological character, would be difficult or impossible, unless deposited in certain basins throughout which the same conditions obtained. This difficulty would be particularly felt in identifying the upper and lower Silurian rocks of Denbigh, where, from the absence of limestones, the physical conditions differed widely from those in the typical counties where the order of superposition was first established. A similar case occurred southward, by the Uske, where the Wenlock limestone was developed, but not the Aymestry, or its Pentamerus. The occurrence of this characteristic fossil seems to depend therefore upon the existence of certain conditions. The absence of slaty cleavage was said to assist in identifying these rocks with the upper Silurian in South Wales: the same cleavage manifested itself in the mountain limestone: it is therefore necessary to determine the cause of cleavage, which thus appears a doubtful character. And if cleavage and mineral character are doubtful, we must come at last to organic remains, and having in them an instrument of reasoning, let them be philosophically considered, and their distribution at the present day studied with caution. Connected with the distribution of organic remains in rocks, are several unsettled problems; a correct account is wanted of their relative distribution upwards, through successive formations, and of their horizontal range—and to ascertain these, numerous memoirs are necessary—*e.g.* the *Bellerophon trilobatus* of the old red sandstone of Salop, occurs in Pembrokeshire deep in the Silurian system; *Conularia quadrisulcata* of the upper Silurian is also found in the lower shales of the mountain limestone; and *Terebratula navicula*, referred to by Mr. Bowman, is variable like all the Brachiopoda, and its distribution wider than assigned by Mr. Murchison. He wished to throw no doubt over the evidence adduced by Mr. Bowman, but spoke of the question generally. The land and sea had undergone changes, and as organic life was proportioned to the physical conditions of each period, it was only by multiplying observations and local details that the typical forms of organic life, which marked each period, could be ascertained; no general conclusion could be arrived at by adopting characters which were only local, or occurred through periods more extensive than supposed.—Prof. Sedgwick contended for the impossibility of grouping strata, till their order of superposition had been obtained by actual sections on an extended scale. Lists of fossils imply that this order has been first ascertained. This was the method used by Smith and the first geologists. When the fossils of each bed have been ascertained, then we may determine what shall be united into great groups under one name—all the subdivisions of the Silurian rocks might have been made out by the mere physical conditions of developement. Of the oolites, three great masses are distinctly marked, and the order of superposition of the coal measures, millstone grit, and mountain limestones is equally decided, and the mineral types distinct. Latterly, fossils have been used too much in distant parts, as in America and France, to ascertain the relative age of rocks, in preference to the evidence of superposition, whereas, the sequence of the beds ought to be the first step; and then by collecting the fossils and comparing both points, we may arrive at general conclusions. Nothing can be made of groups of rocks without first ascertaining the order of their superposition, because these fossils of the oolites, mountain limestone, &c. might, for all we know, have existed in separate bays of the same sea. The lower Silurian rocks evidently underlie the other beds described, and graduate upwards into them; they lie transversely to the bedding of the true slates and trappean rocks, and may be traced along the strike resting unconformably on their edges. Many disruptions, therefore, probably took place, prior even to the deposition of the upper Silurian rocks. They run in this way across the country, but afterwards become perpendicular as well as the older rocks, and run side by side with them to the sea, near Conway. In the Berwyns, the beds correspond in strike with the Caradoc sandstone; the descending section begins with the sandstone with Cardiola, then limestones, and the centre is composed of Caradoc sandstone with its characteristic fossils. In the upper Silurian rocks we find the upper and lower flags and upper Ludlow marls, and pass on to the mountain limestone, without the old red sandstone; but this view must be abandoned; the cornstones of the upper division represent both the upper Ludlow rock and the old red sandstone. In Mr. Murchison's part of the country there is no line of distinction between the two formations, and Mr. Murchison's fossils of the old red sandstone should probably be included in the upper member of the Silurian system; the same fossils might be exhibited here. An exact counterpart occurs in the upper slates of Westmoreland, where there is no conformity between the higher slates and cornstones of Kendal and Kirkby Lonsdale and the conglomerates over them. The conglomerates rest on the edges of the cornstone, and solid bands of sandstone occur at intervals throughout them; there is therefore little value in mineral types for drawing lines between systems. As the lower Silurian rocks of the district had assumed their position before the upper were deposited, Prof. Sedgwick does not consider the dip of the upper beds at all connected with the centres of igneous eruption. Cleavage may appear anywhere, yet these

lines are useful where even negative facts assist. In many of the older rocks, such as the Cambrian, no cleavage exists, although they are slaty. In the oldest stratified rocks, such as mica schist, and whether metamorphic or otherwise, we find a highly crystalline structure; no force could break the laminæ and superinduce cleavage. Wherever cleavage occurs, it affects extensive masses, and required adequate forces. A single crystal will have more than one plane; no rocks in England have a second plane, except west of Padstow, and there one is much more pronounced than the other. In Belgium, where a second cleavage occurs, indicating a *re*-arrangement of the parts, the slates are spoiled by becoming brittle in another direction. Where calcareous matter abounds in rocks, a cleavage plane may be introduced, and a certain quantity would be favourable to its developement, since the law of polarity would operate on the crystals; but if too calcareous, cleavage would be lost by its becoming limestone.—In reply to a question from the Rev. David Williams as to grouping the old red sandstone with the Silurian system, Prof. Sedgwick observed, that on the continent they would doubtless pack the old red with the Silurian; that he and Mr. Murchison had cut up the Eifel rocks so as to agree with the English series, and thereby divided some formations through the middle. The ultimate arrangement of large groups, and the estimation of their Fauna and Flora, could only be done by the comparison of an enormous number of species of organic remains, and could be decided, not by the examination of one or more countries, but by the whole world.—Mr. De la Beche observed, in connexion with the subject of the distribution of species, that causes were often presupposed to have operated similarly over very extensive areas, whereas there may be totally different deposits within very limited districts; and as certain conditions might continue on some part of the globe through very long periods, organic remains of the same species might be found in rocks of very different ages.

'Report of the Committee appointed at Glasgow, for obtaining Instruments and Registers to record shocks of Earthquakes in Scotland and Ireland.' Communicated by Mr. Milne.

The Committee state, that no correspondence had been maintained with their associates in Ireland, with respect to the instruments used in making observations, or the localities where they should be placed. After several meetings held by the Committee in Scotland, at the beginning of the winter, to consider the instruments most fitted to register the shocks, two new forms were adopted, those previously constructed and fixed at Comrie, in Perthshire, not having been found sufficiently sensitive. 1. *Common Pendulum Seismometer.*—The pendulum is thirty-nine inches in length from its point of suspension to its lower extremity, where there is a piece of soft chalk, in the form of a pencil, which, as the pendulum vibrates, marks on a concave piece of wood painted black, and forming the segment of a sphere with a radius of 39 inches. This segment has white circular lines painted on it, parallel with its circumference, one inch apart from each other: also the cardinal points of the compass marked on it. Near the lower end of the pendulum there is a leaden ball, of about 4 or 5 lb. weight, which is perforated through the middle, so as to admit the pendulum through it. The chalk pencil presses on the wooden board by a small leaden weight resting on its upper end, inside a metal tube containing the pencil. Three wooden rods fixed to the spherical segment, and uniting above, form a point from which the pendulum is suspended, and the instrument is fixed by three feet to the floor of a room. The chalk is brought to the centre of the concave segment by adjusting screws; and the circles marked 1, 2, 3, &c., indicate the number of inches to which the lower extremity of the pendulum is thrown from the centre; the cardinal points show the direction in which the shock has proceeded. 2. *Inverted Pendulum Seismometer.*—Two of these instruments have been used: the smallest has a pendulum 39 inches long, and is fixed into a brass socket at its lower end. The connexion between the pendulum and socket is a strong elastic wire, which can be raised or depressed by a pinching screw, so as to increase or diminish the length and sensibility of the pendulum. There is a leaden ball near the top of the pendulum, from 3 to 4 lb. in weight: a hole through its centre allows the pendulum rod to pass freely through it, and it can be fixed at any part of the rod by means of a pinching screw. At the upper extremity of the pendulum is a soft lead pencil, which rests on an elastic wire contained in a brass tube: it is thus pressed against a white surface of paper, forming the segment of a sphere having a radius of 39 inches. The paper is pasted on a piece of copper, beaten into the proper shape, and supported by four upright rods fixed to the base, which consists of four flat iron bars, which cross in the middle, and support the socket before described. On the white segment are concentric lines and cardinal points, as in the other instrument. The other instrument constructed on this principle has a pendulum 10 feet 8 inches in length; the spherical segment on which its vibrations are marked, is suspended over it by a strong holdfast of iron, fixed in the wall. These instruments were sent to Comrie, on account of the frequency of shocks felt there during the last fifty years; and the earthquake of 1839 was felt more strongly there than in any other part of Scotland. They were given in charge to Mr. Peter Macfarlane, Port-master. The largest, on the inverted-pendulum principle, was fixed inside the steepie of the parish church; the other, on the same principle, is at Comrie House, a quarter of a mile north of Comrie, under the care of Col. Simpson, who resides there. The remaining instrument is at Garriechrow, in Cluan Hill, two miles west of Comrie, and is under the immediate charge of Sir David Dundas, Bart. These instruments were erected a few days before the 1st January, 1841, since which they have been affected only twice, viz., on the 10th and 22nd March, 1841. On the first occasion, both the inverted pendulums were thrown half an inch to the west; on the second occasion also to the west, but scarcely half an inch. The simple pendulum at Garriechrow has not been affected, and is thought not sufficiently sensitive. From the motion of the two instruments, a sudden horizontal movement of the ground towards the east seems to have taken place, amounting, on the first occasion, to half an inch; on the second, less than half an inch. Those who experienced the shocks also considered the first to have been most severe, but not half so severe as that of October, 1839. Mr. Macfarlane states, that on both occasions a vertical movement was also felt, which could not be indicated by these instruments, but was by one of his own. It is therefore proposed to adopt new instruments calculated for vertical movements, which may sometimes occur without any horizontal displacement; and also instruments for horizontal movements more sensitive than those now in use, as Mr. Macfarlane reports, that in the interval between January 1st and July 1st, during which the instruments had recorded only two shocks, he had felt twenty-seven distinctly. The Comrie shocks have been supposed to emanate from a particular spot, whose precise locality is not yet ascertained. By many persons they are supposed to be connected with the state of the atmosphere and electrical agencies; and it is thought desirable to obtain some meteorological instruments, to be also placed at Comrie, and their indications registered. Reference is made to a similar register of earthquake shocks kept at St. Jean de Maurienne, from 19th Dec. 1838 to April 1840, published in the Transactions of the Royal Academy of Turin.

The Marquis of Northampton urged the importance of communicating with the Committees in Ireland and elsewhere, to secure the adoption at each place of the best instruments.—Prof. Sedgwick was of opinion, that instruments to record the more minute shocks were of essential importance; the sensations of individuals would be a very bad test, as one person's nerves might be much more sensitive than another's. He considered the pendulum the best instrument to measure horizontal movements, and for the vertical he suggested the introduction of some new instrument, such as a nicely balanced column: also the importance of attaching the apparatus to clockwork, in such a way as to secure the registry of the periods of movement.—Dr. Buckland described the geological situation of Comrie as in a trough parallel to the Grampians: the rocks are of old red sandstone, and walls of trap burst through them in many places; one large dyke is situated close to the town of Comrie. He referred to the much greater frequency of shocks in Great Britain than generally supposed, especially along great lines of fault, as at Chichester, where their occurrence is very frequent. A watchmaker in Comrie had noticed, that when the shocks occurred, those pendulums which were vibrating in the direction taken by the shocks, were thrown forward; and those placed transversely to the direction of the shock, received a force in the direction perpendicular to their vibration. To indicate shocks which occurred during the night, some persons in Comrie kept a basin with treacle, which, when thrown forward by the shock, indicated by its rise the direction in which it passed. Watchmakers in town make the finest part of their work at night, because the vibration caused by carriages is then least felt; and they make use of a ball attached to a watchspring, set upwards, which will indicate the slightest vibration.—Mr. De la Beche stated, that the indication of shocks by a vessel containing treacle, had been originally suggested by Mr. Babbage, and was frequently used in Jamaica, where earthquake shocks were of constant occurrence; and the test of treacle had showed they possessed a common direction, but it gave no indication of the intensity of the shock. The relative severity of earthquakes at contiguous places, depends upon the continuity of the rocks, and on their structure and position. Sometimes they had been experienced severely upon hard rocks, which served to transmit the vibrations powerfully, whilst on gravel and similar deposits they were much less intense.—Prof. Sedgwick also adduced instances, as in the case of Calabria, when the lower beds were much more affected than the upper; and other occasions, when the upper beds were affected, and the lower untouched: he considered an account ought to be made of the influence of subsoil, wherever registers of shocks were kept.

'On the occurrence of some minute Fossil Crustaceans in Palæozoic Rocks,' by Mr. John Phillips.

The freshwater limestones of Sussex and the tertiary beds have yielded great abundance of minute Crustaceans belonging to the same group with the Cypris, a small, bivalvular, pencil-footed animal, abounding in shallows of fresh water, where the warmth of the sun, and abundance of decaying vegetable and animal matter conduce to their rapid multiplication. Beside these, there is a marine group called Cythera, and it is not easy to determine to which of these groups the fossil species belong; and in consequence the marine or fluviatile origin of the strata in which they occur, is not always safely determinable from their occurrence. In the Weald of Sussex, and in the tertiary beds, their identification with the freshwater group is probably correct, but they occur also in situations not hitherto expected, and where the evidence remains to be examined. In the coal shales of Yorkshire, which are 4000 feet thick, there occurs a band of marine shells, such as Goniatites, Orthoceras, and Pectens, without one freshwater shell, and above and below it, beds with indications, by shells, of fluviatile, if not decidedly freshwater origin; and the author noticed in 1831, that Cyprides occur mixed with the freshwater shells above the marine deposit. Dr. Hibbert described in 1834 to the British Association at Edinburgh, what he conceived to be freshwater Cyprides in the limestones of Burdie House; and in 1836 Mr. Phillips discovered vast abundance of Cyprides in the limestone of the upper coal measures at Ardwick, north of Manchester, and immense numbers in black shales of the Bradford Collieries; and Mr. Binney has since found them in a great variety of situations. To the Dublin Geological Society (1840) Mr. M'Coy has announced 13 or 14 species in the mountain limestones of Kildare, which are full of marine organic remains. Mr. Phillips had lately observed in Pembrokeshire in the lowest shales of the mountain limestone, within 10 feet of the old red sandstone, beds of Cyprides very similar to those in the black shales of the upper coal measures in Manchester. These are probably the most ancient specimens of the group yet discovered. The circumstances under which these Crustaceans are found at the present day, appear to agree with those attending their occurrence in a fossil state; the recent Cyprides seem destined to consume the perishing parts of animal and vegetable substances, and the fossil species are generally associated with portions of fishes near Manchester, as observed at Ardwick by the author, and elsewhere by Mr. Binney, and by Dr. Hibbert at Burdie House. In Caldey Island they are in like manner associated with bone and fish beds. Probably their remains occur under many circumstances, but to ascertain all the conditions under which they lived, requires attention to many sorts of strata not often suspected to contain remains. Very remarkable conditions occurred when the old red sandstone ceased to be deposited; for then, after a long series of formations, with no trace of organic remains, we find in the beds immediately above, thousands of minute Crustaceans, bone beds, layers of Brachiopoda, &c. of marine origin; and, encouraged by this example, we may expect to find them in beds of still higher antiquity.

Dr. Buckland described the appearance and habits of some of the existing Cyprides and allied families, which, during warm weather, abound in ponds in the bottom of old quarries, the tanks in greenhouses, and various other situations. One species, the *Branchiopus stagnalis* is particularly abundant in pools of *fresh* water, whilst another is found only in the artificial brine in the works at Leamington, and in the natural brine ponds on the borders of the estuary left by the spring tides. The animals themselves, as well as their eggs, survive the desiccation, and reappear immediately with the return of a supply of water.—Mr. J. Phillips remarked the fact of these cypridiform Crustaceans constituting the general type of Entomostraca through a large range of the strata, being in the older or palæozoic rocks, unaccompanied by decapodous Crustaceans which lie in later deposits, but flanked by a parallel series of Trilobites, which are absent from those newer strata.

'On the Geological Changes produced by the *Saxicava rugosa* in Plymouth Sound,' by Mr. W. Walker.—The *Saxicava rugosa* appears to be the prevailing perforator of the limestone rocks; and it is the author's opinion, that these operations have been carried on during such long periods as to "destroy rocks, and make deep water where shoals previously existed." The different places in which the perforations had been extensive, or might yet be most advantageously examined, are next described. The blocks of Portland stone to which the buoys were formerly attached, in two or three years were punctured on the surface and also deeply perforated by the Saxicava; and in the sea-walls of Devonport Dockyard, also of Portland stone, below the low water level of spring tides the stone is honeycombed and frittered away. Between the Devil's Point and Mount Edgecumbe the channel is 200 feet wide, and three or four times deeper than in the Sound. In using the diving bell to cut away rocks in this channel, in order to form the sea walls of the Royal William Victualling Yard, the limestone was found much perforated, and rocks brought up by the trawl from 20 and 25 fathom water were also perforated. The sides and bottom of this channel are of limestone, and the rapidity of the current keeps its surface clear; wherever this is the case, throughout the Sound, the bottom is found perforated by the Saxicava. The author then proceeds to show, that throughout the Sound there is a greater depth of water over the limestone rocks than over the red sandstone, and he attributes this degradation to the boring of Saxicava. The rocky shoals lying southward of a line drawn from Mount Edgecumbe through Drake Island to Mount Batten, are composed of red sandstone, and lie from 12 to 17 feet beneath the level of low water spring tides. The depth of water over the anchorage, within the Breakwater, varies from 27 to 36 feet; but immediately on passing the boundary line of the sandstone, northward, the water becomes deeper, and where the rapidity of the tidal current prevents deposits of mud or sand, the depth varies from 50 to 120 feet over the limestone. The limestone hills around Plymouth are next described; and it appears that their elevation is generally less than that of the surrounding sandstone. These limestone heights at Stonehouse, Plymouth, Mount Batten, and Oreston, are nearly of the same elevation; raised beaches, rounded pebbles, and water-worn surfaces, furnish evidence of their having been once under water. Near the north-west corner of Drake Island, is a small portion of limestone on a level with the ordinary high water, bearing traces of the perforations of Saxicava; and the rocky cliffs near Plymouth Citadel, from the low water mark of spring tides, up to 15 or 20 feet above high water level, bear evidence of the same ravages; and at 15 or 20 feet above the sea is a conglomerate mass of pebbles, sand, and shells, and some limestone pebbles, perforated by Saxicava. At low water mark are the animals in their holes, higher up their empty shells, and above high water their perforations only are to be found. In the limestone in Hoe lake, the author very recently found perforations by the *Pholas*, 100 feet above the level of low water spring tides. It was protected from atmospheric influence by a coating of earth and vegetation. From these circumstances it appears that all the limestone rocks around Plymouth, were under water within the period during which the Saxicava was the great agent in the destruction of the rocks. In some cases the rocks are protected from these ravages by a coating of Balani, &c. which cover the rock, and in other places, deposits of mud and sand are formed over the rocky bottom, and there the operations of Saxicava and Pholas necessarily cease. Since the Breakwater was erected, the water over the rocks near the Citadel has been diminishing, from the accumulation of mud and sand, and an anchorage is forming where nothing but rocks previously existed. In conclusion, the author refers to the operations of boring shells on the mole of Castel à Mare in the Bay of Naples, and on other artificial structures; and suggests to engineers employed in the erection of public works, such as quays, docks, basins, or breakwaters, intended to last for centuries, the importance of considering whether limestone *of any kind* should be employed in such structures below the ordinary level of low water at spring tides.

Mr. De la Beche stated that the raised beaches and attendant phenomena at Plymouth, had been first ascertained many years since by Mr. Hennah. The perforations were apparently by several other animals, as well as Saxicava, and he considered these perforations chiefly destructive, by exposing a greater amount of surface to the action of other agents, such as carbonic acid.—Dr. Buckland remarked upon the practical use of Mr. Walker's observations, in pointing out granite as the proper material in the construction of works below low water mark. With regard to the specimens of perforated rocks, those from Mount Batten were decidedly neither the work of Saxicava nor Pholas, but precisely resembled some detected by Mr. Greenough in Boulogne, which were the work of common garden snails (*Helix aspersa*). At Tenby, Mr. Phillips and Dr. Buckland had observed the same kind of perforation; and Mr. Sopwith had noticed them as occurring commonly in Northumberland, on the *underside* of overhanging shelves of mountain limestone. The holes made by the Pholas and Saxicava are smaller at the aperture, and increase inward as the shell grows, always assuming its shape. Those made by the snails are largest in the aperture, irregular in form and direction, so as often to trench upon another. Dr. Buckland attributed the perforations of the Pholas to the solvent powers of an acid secretion, softening the rock, which would afterwards be worn away by the rasping action of the shell; those produced by the land snails, he also attributed to the action of acid secreted in very small quantities by the foot of the animal during their daily retreat to these habitats, through very long periods of time. Apertures such as these, occurring at great heights, and far inland, could therefore no longer be adduced in proof of elevation.—Prof. Owen objected to the mode of accounting for the perforations of the Pholas and other boring molluscs by acid secretions, because rocks which are not calcareous are also bored by bivalves. He attributed the formation of these cavities to the constant current of water around the shells, produced by extremely minute, vibratile ciliæ, which move incessantly, and independently of the will of the animal. The ciliæ cover the whole of the gills (branchia) and other parts of the animal, and produce currents in the water necessary to its existence; when lodged in the rock, the currents increase in intensity as the shell proceeds inwards.—Mr. J. Phillips considered the small holes covering the surface of some of the rocks due to a different cause from the deep excavations occupied by the Pholas and Saxicava; besides the boring Mollusca, several other animals are known, which have a characteristic mode of perforating rocks. He alluded to the beautiful regularity of the holes made by the Pholas, in proof of their being formed by the shell, and not by currents of water.—Mr. De la Beche observed, that free carbonic acid, applied to the limestone, will convert it into a bicarbonate, soluble in water, and the animal might apply the acid exhaled in breathing to the purpose of softening the rock.—Dr. Buckland, in reply to Prof. Owen's remarks, observed, that if the perforations were owing to currents, the greatest force would be exerted at the aperture, which would, consequently, be the largest part. At Lyme Regis, the interior of the perforation made by Pholades was marked by parallel circular striæ, owing to the mechanical action of the shell, which rasps away the rock, and necessarily increases the size of the cavity in exact proportion with its growth. In the other case of perforation attributed to land snails, the action was entirely chemical, and their agency was only adduced to account for appearances which the Pholades could not possibly have occasioned.—Prof. Henslow mentioned perforations in limestone rocks from Barnstaple, in the Cambridge Museum, which were hollowed by the chemical action of muriate of lime having converted some parts into carbonate of soda.—Mr. R. A. C. Austen considered the borings of shells were not to be accounted for by the action of acid, as the operations of *Saxicava rugosa* were not confined to limestone rocks. In Tor Bay the trap rocks are also perforated, and the old red sandstone is frequently found bored by Pholades. He also objected to the other cavities being formed by land snails, there being but one time of the year when they remain fixed to a particular spot, and then a film (epiphragm) is formed over the mouth of the shell, which is afterwards left attached to the rock or other object, which renders it improbable another snail would adhere to the same place.—Dr. Buckland, in reply to a question by Mr. H. E. Strickland, mentioned that the locality of the perforations by snails at Boulogne was six miles inland; at Alston Moor and other places it was also far from the sea.

Section D.—Zoology and Botany.

President—J. Richardson, M.D.
Vice-Presidents—Mr. R. Owen, Prof. Henslow, Mr. J. E. Gray.
Secretaries—E. Lankester, M.D., Messrs. R. Patterson, J. Couch.

Committee—Lieut.-Col. H. Smith, Rev. W. Garnons, Col. Sykes, Messrs. R. C. Austen, H. Strickland, H. E. Strickland, E. Bowman, Rev. W. Hore, Messrs. R. Ball, W. Lister, R. Taylor, Prof. Daubeny, M.D.

Dr. Richardson in the chair.

The first paper presented to the Section was 'On the Geographical Distribution of the Animals of New Holland,' by Mr. Gray.—If, (said Mr. Gray) in our collections and catalogues, we were to mark all the species found in Europe as coming from England, we should be nearly as correct as we are at present in the determination of the localities of the Australian animals, for almost all the specimens are marked as coming from New Holland. This is not only the case with the specimens contained in the Museum, but also with respect to the observations of some recent voyagers. Having recently received, at the British Museum, a complete series of all the Mammalia collected by Mr. Gould during his visit to Australia, and of those sent from his collector, Mr. Gilbert, from Western Australia, all the specimens of which were marked at the time they were collected, I have been induced to draw up a few remarks on the geographical distinctions of these animals. From these materials, and others at my command, I believe there are, at present, known 94 species of mammalia found in Australia, belonging to 33 genera. Of these, 70 species, belonging to 21 genera, are marsupial, 3 species and 2 genera are monotrematous, and 21 species, 10 genera, non-marsupial; 8 of these 21 species and 4 genera are bats, belonging to the order of Primates; 2 species, belonging to 2 genera, Feræ or carnivorous beasts, as the dog and the seal; and the remaining 11 species, referable to 4 genera, are mice, belonging to the Glires. Of these 33 genera found in Australasia, 6, as Chæropus, Acrobates, Lagochestes, Phascolarctos, Pseudomys, and Harpalotes, are peculiar to New South Wales. Belideus might be placed in the same group; but a single species is also found in Norfolk Island, where it is the only known beast. It is by some supposed to have been introduced from Sidney, especially as it is not found in Van Diemen's Land. The genera Macropus, Bettongia, and Petrogalea, are only found in New South Wales, South Australia, and the north coast, as the genus Myrmecobius is peculiar to Western Australia; so that these 10 genera are peculiar to the Australian continent. The genera Thylacinus, Diabolus, Dromicea, and Phascolarctos, are peculiar to Van Diemen's Land. The genera Dasyurus and Perameles are common to Van Diemen's Land and the continent, but much more abundant in the former. The genera Nyctophilus, Phalangista, Ptenos, Phascogalea, Halmaturus, Hypsiprymnus, and Hydromys, appear to be common to the continent of Australia and Van Diemen's Land, as also appears to be the case with the genera Echidna and Ornithorhynchus; but the two latter genera have not yet been discovered in South Australia. There are some species found in Australia which belong to genera, as Pteropus and Rhinolophus, which are found in different parts of the Old World; and others, as Canis, Mus, Scotophilus, which are common to it and both hemispheres. One genus, Halmaturus, has a species found in New Guinea; but most probably when this species has been more carefully examined, it will be found to form a peculiar genus, allied to the Australian one, as is the case with the tree kangaroos (Dendrolegus) and the Phalangers (Cuscus) of that country; and is also probably the case with the Perameles, said to be found in New Guinea. If we examine the distribution of these 94 species over the different parts of the country, we shall find that 58 species inhabit New South Wales, of which 41 are peculiar to it, and 13 common to it and other parts of the country. 12 species inhabit South Australia; 6 are peculiar, and 6 common to other parts. 19 species inhabit Western Australia; 12 peculiar, and 7 common. 5 species inhabit the north-west coast, all of which are peculiar to it; 2 species the north coast, one of which has not been found elsewhere. 21

species are found in Van Diemen's Land; 11 are only found in that country, and 10 common to it and the continent. 1 species is found in Norfolk Island, which is also found in New South Wales, but not in Van Diemen's Land. The species peculiar to the north-west coast are *Macropus unguifer*, *Halmaturus Bennettii*, *H. fasciatus*, *Petrogalea brachyotus*. To South Australia, *Phascogalea rufogaster*, *Macropus fuliginosus*, *Halmaturus Derbianus*, *Mus Cunninghami*, and *M. Adeloderses*. To Western Australia, *Myrmecobius fasciatus*, *Phascogalea leucogaster*, *Perameles fusceventer*, *P. obesula* and *P. Lagotis*, *Halmaturus manicatus*, *H. brevicaudatus*, *Petrogalea lateralis*, *Macropus lunatus*, *Hypsiprymnus Gilberti*, and *Bettongia Ogilvii*. *Macropus laniger* and *Mus lutreola* are peculiar, as being common to the east and south sides of the continents. *Scotophilus Australis*, *Hydromys chrysogaster*, *Phalangista vulpina*, and *Ptenos Cookii*, have the largest range, as they are common to the south, west, and east sides of the continent, and the two latter are also found in Van Diemen's Land.

Dr. RICHARDSON observed, that no country had produced subjects of greater interest to the naturalist than New Holland; and now that the country was getting settled, it was desirable that the amount of information obtained from various sources should be brought together.—Prof. OWEN stated, that in a Dutch work recently published, an account had been given of a kangaroo in New Guinea. It was distinguished from other kangaroos by a peculiar form of claw, which was lengthened, and the animal thus enabled to climb trees. From this circumstance it was called the Tree Kangaroo. It had been constituted a new genus. The typical genus, therefore, of this remarkable family was still peculiar to New Holland. The genus Perameles also unquestionably existed in New Guinea.—Mr. GRAY doubted the authority of the Dutch naturalists on this subject. A kangaroo from New Guinea would undoubtedly be a new genus. Speaking of this family, he alluded to the difficulty that occurred in making new genera. Some of the animals, with entirely different habits, had almost the same structure, or one so little different, that it could be with difficulty observed.—Prof. Owen alluded to the fact, that at the present day the dog-headed opossum and great dasyurus were peculiar to New Holland, yet the remains of these animals, or some very similar, had been found by Capt. Mitchell in the caves of Wellington Valley. Mr. Gould had brought over a large kangaroo, but it was much smaller than those could have been, the remains of which were found by Capt. Mitchell.

Prof. HENSLOW invited the co-operation of members in his attempts at perfecting the natural history of the wheat-midge (*Cecidomyia tritici*). He stated, that he had not been able to breed a single fly from many hundred larvæ which he had procured from the barns in his neighbourhood, during the winter months, by sifting the chaff immediately after the corn had been dressed. Mr. Curtis had been equally unsuccessful. The inquiry to which he was anxious to direct the attention of naturalists, was, whether the flies which appear in myriads during the first week of June, and then deposit their eggs in the ears of wheat, have proceeded from larvæ which had entered the ground, and had there assumed the pupa state, or from larvæ which are housed in great profusion with the corn, and lie concealed in the ears. He considered it of importance to determine this point correctly, as the possibility of checking the pest probably depended upon the result. The Professor then exhibited specimens of *Puccinia graminis* (mildew) in connexion with *Uredo rubigo*, *Aregma rosæ* in connexion with *Uredo rosæ*, and *Phragmidium obtusum* in connexion with *Uredo potentillæ*, for the purpose of illustrating and confirming an opinion he had advanced in the Journal of the Royal Agricultural Society, that rust and mildew were produced by the same fungus; and also of showing generally that all the species referred to the genus Uredo were probably only imperfect states of certain fungi belonging to Puccinia and other allied genera.

Mr. R. TAYLOR stated that the American Philosophical Society had published a paper on this subject, written by a lady, and was at present prosecuting further inquiries.—Prof. HENSLOW said, that the American insect was the Hessian fly. It belonged to the genus Cecidomyia, but was a different species from the wheat-midge.—Mr. WEBB HALL wished to know if Prof. Henslow thought the wheat-midge an effect of a disordered state in the plant, or a cause of it?—Prof. Henslow replied, that he had always considered the insect as the entire cause.—Mr. ROBERTS inquired what was the opinion as to the barberry (*Berberis vulgaris*) being the cause.—Dr. RICHARDSON said, the barberry was subject to a fungus similar to that producing the disease of wheat, and it might be thus communicated.—Mr. GRAY believed the Uredo of the barberry to be distinct from that of the corn.—Mr. Webb Hall observed, that this question had two sources of interest; first, that of the history of the fungus, and second, its relation to agriculture. He thought that in all cases in which rust appeared, the plants were previously unhealthy, and that this state might be guarded against by proper precautions. The state of the plant which predisposed it to the attacks of fungi, he believed to be one of plethora. If land was too highly manured, plants became diseased. He had seen whole fields saved from disease by the appearance of fine weather. He did not think the barberry produced the disease: the fact was, that what produced rust in one would produce it in the other. In Shropshire an opinion prevailed that a want of air produced unhealthiness in plants, and, consequently, they were cutting down their hedges for the purpose of affording more air.—Prof. Henslow observed, that corn had often been sown around barberries, and no mildew had ever been the result; but, at the same time, the evidence on the other side was very strong, and he could not give a positive opinion.

'On the Zoology of the County of Cornwall,' by J. Couch.

Of the fourteen or fifteen species of Cheiroptera, enumerated by Mr. Bell as British, six are included in the Cornish Fauna, and one more (*V. discolor*) has been found at no greater distance than Plymouth. Of the remainder, eight are too limited in numbers and distribution, to enter into a calculation of comparison with other parts of the kingdom. The commonest of the Cornish bats are the Pipistrell, Lesser-Horseshoe, and Long-eared, in the order in which they are enumerated; but their local occurrence depends more on the accident of their meeting with congenial haunts, than on the mere influence of climate. The latter circumstance, however, produces its effect on the habits of these animals; so that in Cornwall, where what may be denominated severely cold winters do not occur more frequently than in cycles of six or eight years, the appearance of the bat may be witnessed in every week in an ordinary year. A fall below the 40th degree of the thermometer is the signal for their retreat; but a slight change to a milder temperature restores them to activity, when not uncommonly they may be seen at midday, in search of prey, which might not be obtained at the more usual hours of the evenings. It may be regarded as another proof of the mildness of the climate, that the long-tailed field mouse (*Mus sylvaticus*) breeds at the very beginning of January, forming its nest at this time in ricks of hay. The frog, also, is rarely later than this period in depositing spawn. Of the genus Sorex, Cornwall possesses three species sufficiently distinguished. These are *Sorex araneus*, of English authors, *S. araneus* of Duvernoy, *S. fodiens*, of Bell, and *S. bicolor* of Jenyns, from which, however, it differs in some particulars. Of birds, 230 species are reported in the Cornish Fauna, to which must now be added, Honey Buzzard, *Buteo apivorus*, Snowy Owl, *Strix nyctea*, Wood Shrike, *Lanius rutilus*, Black Start, *Phœnicura tithys*, Grey-headed Wagtail, *Motacilla flava*, White Crossbill, *Loxia fulvirostra*, Rose-coloured Pastor, *Pastor roseus*, Mawmet Pigeon, *Columba Turcica*, (killed at St. Enodor in August 1840, but probably a variety of the common Carrier Pigeon escaped from confinement,) Night Heron, *Ardea nycticorax*, Dotterell, *Charadrius Morinellus*, Spotted Red-shank, *Tetanus fuscus*, Wood Sandpiper, *T. glareola*, Pectoral Sandpiper, *Tringa pectoralis*, Wilson's Petrel, *Procellaria Wilsoni*. The number of fishes reported in the Cornish Fauna amounts to 167 species; of stalk-eyed Crustaceans 67, to both which, and to the testaceous Mollusks, &c. Mr. Couch proposed additions, but we need not report these, as a second part of the Cornish Fauna is about to be published.

Mr. COUCH then distributed some specimens of *Helix picina*, a rare shell.—Mr. G. BARTLETT observed, that he had found this *Helix* with *Cyclostoma elegans*, and *H. nitidissima*, with remains of extinct animals, in a cave at Berry Head, in Cornwall.—Mr. STRICKLAND thought it probable that the shells were introduced into the cave accidentally, long after the animals were imbedded. He had found in Worcestershire twenty-three species of Mollusca, with extinct animal remains; three of these species were extinct, and were therefore probably of the age of the remains.—Prof. Henslow had found in Cambridgeshire land and freshwater shells, in conjunction with extinct animal remains.

'On some Species of European Pines,' by Capt. Widdington, R.N.

In a paper on European Pines, read at Newcastle (*Athen.* No. 566), the author did not allude to two species, as he had not seen them, viz.—*Pinus austriaca* and *P. pumilio*. Opportunities of observing them have since presented themselves. *Pinus austriaca* of English, *P. ingrescens* of the German botanists, partly covers the plain of Austria to the south and east of Vienna. It is also found in Austria on the borders of Styria, and clothes the hills near Baden. It does not appear to the north of this, and in considering its elevation and geography, it must be placed in the zone below *Pinus sylvestris*; at the same time there can be no question that it would withstand the cold of these islands. It is very nearly connected with *P. Taurica*, or *Pallasiana*; the foliage is scarcely to be distinguished. There is, however, a very perceptible difference in the form of the cones in cultivated species. From the quick growth of this tree, the great beauty of its foliage, thick and tangled, and of the deepest green, as well as the great value of the timber, which Austrian woodmen consider superior to that of *P. sylvestris*, Mr. Lawson, of Edinburgh, first introduced this species, and it might be planted in most places as a substitute for the Pinaster, to which it is much superior, both in timber and appearance. *Pinus pumilio* is a native, though sparingly, of Upper Styria; it is most abundant in the Bavarian Alps. It inhabits marshy districts and the borders of lakes, as well as dry gravelly situations. The peculiar form of this tree consists in its having no regular leader. It divides into a number of small stems and branches immediately above the ground. The height attained is rarely more than five or six feet, and the diameter of all the branches of the largest trees was not more than twenty or twenty-five feet. It grows so regularly, that, on looking over an extensive level planted with it, it is quite as even as the level of a gorse cover. The foliage, in form and colour, resembles that of *P. uncinata*, but the spicula are shorter. The cones are small, and dark-coloured, and differ from those of *P. sylvestris* and *P. uncinata*. It is frequently confounded with stunted varieties of other pines. Its position in geographical range is by the side of *P. Cembra* and *P. uncinata*.

A Member stated that the reason the Pinaster was so extensively planted in the west of England, was, that no other pine would withstand the blasts of the south-west winds.—Prof. ROBINSON had been informed by an Italian botanist, that the *Pinus maritima* resisted the action of sea winds, and was grown for this reason on the coasts of Italy. He had tried to grow it in the north of Ireland, but found the climate too cold.—A Member stated that *P. maritima* was grown at Torquay, and was flourishing.

Dr. Lankester communicated some additional observations on the existence of organic beings in mineral waters (*Athen.* No. 674).—He had found the *Conferva nivea* of Dillwyn in the sulphur spring on the River Leith, near Edinburgh. He had also found it in the wells of Moffat in Dumfriesshire, Gillesland in Northumberland, and Middleton and Croft in Yorkshire. At Moffat he found great quantities of the substance called *glairine*, and was convinced of its organic nature. At Moffat also he found a pink deposit in the drains outside the wells, and, on submitting it to the action of the microscope, he found that it was produced by an animalcule, but much smaller in size than those which produced the coloured sediments of Harrowgate and Askern. It had the characters of a Monas, and was not more than $\frac{1}{1500}$ of an inch in diameter.

Dr. DAUBENY stated that D'Anglada, an Italian chemist, had spent much time in the investigation of glairine, and believed it to be the produce of che-

mical action in the waters. He had long since come to the conclusion that glairine was an organic product; and in his Report on mineral and thermal waters, presented to the Association at Bristol, had stated his opinion.

Section E.—MEDICAL SCIENCE.

President—P. M. Roget, M.D.
Vice-Presidents—P. Miller, M.D., Sir D. Dickson.
Secretaries—J. Butter, M.D., Mr. J. Fuge. R. S. Sargent, M.D.
Committee—Mr. S. Derry, Drs. Hodgkins, Saunders, Armstrong, Davie, Professors J. B. C. Williams, Sharpie, Harrison.

This Section has hitherto derived its principal interest and more important papers from the zeal and scientific acquirements of the local members. What then will be inferred as to the state of Medical Science in the west of England, when we record that the Section met on Thursday and Friday, and were compelled to adjourn, not a single paper having been presented to the Secretaries?

Section F.—STATISTICS.

President—Lieut.-Col. Sykes.
Vice-Presidents—Prof. A. Quetelet, Viscount Ebrington, Mr. L. Horner, Rev. Mr. Hore.
Secretaries—Rev. P. Byeth, D.D., Rev. R. Luney, Mr. R. W. Rawson.
Committee—Capt. Creyke, R.N., Messrs. D. Derry, C. B. Fripp, W. Hall, J. Heywood, Sir C. Lemon, Bart., Capt. T. L. Lewis, R.E., Messrs. E. Moore, W. Nield, Rev. W. Odgers, Mr. H. J. Porter, Col. H. Smith, Mr. J. Taylor, jun., Dr. W. C. Taylor, Messrs. R. Wallace, H. Woolcombe, Lord Francis Egerton, Col. Pedler, Mr. Dent, Dr. Bowring.

Mr. H. Woolcombe read a paper on the Statistics of Plymouth, Stonehouse, and Devonport.—Though some Roman and British coins have been found in the vicinity, there are no traces of the existence of any Roman settlement or of any town, here or in the immediate neighbourhood, in the Anglo-Saxon times; In Domesday Book, Sutton, the ancient name of the township, appears to have been tenanted only by serfs and fishermen. In the reign of Henry I. a part of Sutton was granted to the Valletort family, and bore their name, in order to distinguish it from Sutton Prior, which was granted to the monks of Plympton. It soon became known as a naval port, for a fleet of 325 vessels assembled in its waters in the reign of Edward I. under the command of Edmund Earl of Lancaster. In the 26th of Edward I. deputies were sent from the town to Parliament. The name of the place was changed to Plymouth about the reign of Edward III. In 1346 it sent a quota of 26 ships and 613 men to the blockade of Calais, but having been subsequently burned by the French, it was so reduced, that in 1414 it did not send representatives to Parliament, though members were returned by Totness, Plympton, Exeter, and Dartmouth. The population of Plymouth, in the last year of Edward III., is stated at 7,000 in the record of the poll-tax levied by that sovereign. In 1439 the borough was incorporated by Henry VI., and has ever since ranked as a corporate town. The corporation early paid attention to the instruction of youth, for there is a record, in 1501, of their having engaged a master at a salary of 10*l.* per annum, to teach grammar to the children of the town. In the reign of Elizabeth, the fleet destined to oppose the Armada was assembled in the port of Plymouth. Some of the most distinguished captains were natives of the town or its neighbourhood. Under the auspices of Sir F. Drake, but at the expense of the corporation, the river Meavy was brought twenty-five miles, from Dartmoor, and from this source the town still continues to receive an abundant supply of fresh water. The increasing prosperity of the town was proved by the formation of the Plymouth Company for colonizing North America, in opposition to the London Company. It was under their auspices that New Plymouth, U.S., was founded. In 1577 the merchants of Plymouth engaged in the slave trade, as records still exist of their having in that year chartered several vessels to Guinea. The Great Civil War was injurious to its prosperity; the people of Plymouth embraced the popular side, while the gentry of the neighbourhood were decided royalists. To punish the townsmen, and to check their republican propensities, Charles II. erected a citadel. Some of the regicides were imprisoned on St. Nicholas Island, where, according to tradition, they were treated with great severity. In the reign of William III. the naval advantages of Plymouth, which had been noticed by Sir Walter Raleigh a century before, were first appreciated by the government. A dock-yard, victualling office, gun wharf, and hospital, were erected, which laid the foundation of the present town of Devonport. In the same year, 1696, the first lighthouse was constructed on the Eddystone. Mr. Woolcombe then detailed the history of the several lighthouses built upon this rock. In 1812 the Breakwater was commenced, but Mr. Woolcombe stated that fears were entertained that this structure would eventually injure the anchorage ground. The population of Plymouth had increased from 20,000 in 1812, to 31,000 in 1831, and to 36,000 according to the present census. The houses are better built than formerly, the appearances of domestic comfort more striking, and the literary and charitable institutions greatly multiplied. The returns of the Custom House for the last official year amounted to 135,930*l.* 15*s.* 7*d.* Stonehouse has risen from a population of 3,667, in 1801, to nearly 10,000 at the present time; while Devonport, which could scarcely be said to exist at the beginning of the century, now contained 34,000 souls. He stated that the chief wants of Plymouth were Church accommodation for the poor, and education. His returns on both subjects were incomplete, but it appeared that there are five churches in Plymouth, two in Stonehouse, and six in Devonport. There are eighteen dissenting chapels and one Jewish synagogue in Plymouth, but the numbers for Stonehouse and Devonport had not been ascertained. There is only one Roman Catholic place of worship in the district, the chapel at Stonehouse. The education returns were confined to the higher classes of schools, and, therefore, are no test of the intellectual condition of the community. Mr. Woolcombe added a rough estimate of the government expenditure, from which it appeared that 2,300*l.* are paid every Friday night in wages to the naval operatives. He had not procured the Ordnance returns.

The next paper was a report 'On the Vital Statistics of Sheffield,' prepared by a local committee, and forwarded to the Section by Dr. Holland. It was exceedingly minute and elaborate, and was only partially read. It began by describing the position of the town, showing how favourably it was circumstanced in respect to ventilation, drainage, and supply of water. It had advanced very rapidly both in population and wealth; but though no data existed for determining the latter, it was believed that wealth had advanced in the greater ratio. Sheffield did not possess many large capitalists; the nature of the trades followed in the town did not require any expensive outlay in stock and machinery. The best proof of its advancement was, that in the middle of the last century there was only one commercial traveller employed in the town; there is now scarcely an establishment that does not employ one or more. The following table shows the increase of population:

In 1736	16,000.		
1801	31,000,	an increase of	2 per cent. per ann.
1811	53,000	——	1½ per cent.
1821	65,000	——	2 per cent.
1831	91,000	——	3½ per cent.
1841	117,000	——	2¼ per cent.

The value of property in Sheffield had been greatly diminished by the cessation of foreign demand; and this had principally affected the cutlers, who depend on the export trade, but had not seriously injured the silversmiths and platers, who look to the home-market. In no place perhaps have the poor-rates exhibited such extraordinary variations. In 1801 they were 7,200*l.*; but in 1820 they rose to 23,000*l.*, out of a rental which, it is supposed, did not exceed 46,000*l.* In 1825 they were reduced to 6,000*l.*; in 1836, to 5,000*l.*; and in 1837, to 4,000*l.* The present amount is 6,500*l.*; and the distress at the present moment is believed to be greater than it has ever been before. Trades in which combinations and associations exist, are found to become claimants on charity less frequently than those which are uncombined. This is attributed by the author of the Report to the habits of foresight and prudence which arise from trade societies for a common object. One branch of trade, within the last four years, paid to unemployed workmen in the same line not less than 2,000*l.* The author of the Report then entered into a comparison of the condition of the operatives in Sheffield with those of Liverpool, Leeds, and Manchester, for the purpose of showing that enormous capitals are not favourable to the happiness of the general body; and that the greatest misery must be expected in the vicinity of the greatest wealth. He dwelt particularly on the fact, that the operatives of Sheffield usually have a house to themselves; and that there is nothing in that town similar to the cellars of Liverpool, or the lodgings of Manchester. The danger to life involved in the manufactures at Sheffield, was illustrated by a comparison of the numbers who die beyond the age of 70 in that town and in other districts.

Out of every 1,000 deaths, the average above 70 is
145 for England and Wales.
210 for the Northern and Western Ridings of Yorkshire.
104 for London.
66 for Sheffield.
63 for Liverpool and Manchester.

The mortality of infants under 7 years of age, in every 1,000—
270 for the mining districts of Staffordshire.
180 in the agricultural counties.
242 in Sheffield.

In comparing the mortalities of different trades, the two classes of occupation most unfavourable to human life, are found to be those which require frequent transitions from heat to cold, and which generate metallic dust. In what is called "dry grinding," the mortality is said to be "truly appalling;" but the rate was not stated, save that "a dry-grinder" is considered an old man at 35. Early marriages in Sheffield are more common among the underpaid than among the higher classes of workmen; and the ratio of children to a marriage is also higher in the more distressed class. But Sheffield exhibits a less ratio of marriage than most other manufacturing towns. In Sheffield (1839-40) the proportion of marriages to a thousand inhabitants was 9½, while in Leeds it was 17. The writer of the Report then entered at great length into the question of Savings Banks, for the purpose of showing that the amount of deposits affords no trustworthy criterion of the prosperity or adversity of a community. He stated that adversity, by forcing prudential considerations on the mind, was more likely to make men become depositors than prosperity. As an example, he stated, that during the last three years trade had notoriously declined in Sheffield, and had gone on in a falling ratio, yet the amount in the savings banks had been on the increase.

In 1838 there were	4,093	depositors to the amount of		142,000*l.*
1839 ..	5,088	.....		143,000*l.*
1840 ..	5,248	.....		148,000*l.*

The proportion of artisans among the depositors appears to be very small; and it is least among those to whom a provision is most necessary. Out of 5,000 cutlers there were only 221 depositors; while out of 450 silversmiths and platers, there are 89. The greatest number of depositors is found in the present year, which is the year of greatest depression. Hence it was inferred, that the amount of deposits in savings banks is no test of the prosperity of the working classes. The reading of the remainder of the paper was adjourned.

The discussion which ensued was directed to the value of savings banks deposits, as a means of estimating the condition of the operative class.—Mr. Rawson supported the views of the author of the Report, contending that, though withdrawal of deposits was proof of distress, yet the increase was no evidence of prosperity.—Col. Sykes said, that if deposits were made freely, the money must have come from the payment of labour, and therefore its amount was to a certain extent a proof of plentiful employment.—Lord Ebrington considered that the depositors in savings banks were the persons least likely to feel the vicissitudes of the labour market. They were generally the best workmen and the best servants, and were kept in employment when others were discharged. He should therefore regard a run on the savings banks as an alarming sign of national distress; but he agreed with the author of the Report, that an increase of deposits was by no means a proof of national prosperity.

Section G.—MECHANICAL SCIENCE.

President—Mr. J. Taylor.
Vice-Presidents—Prof. Moseley, Messrs. J. S. Enys, J. M. Rendel.
Secretaries—Messrs. H. Chatfield, T. Webster.
Committee—Messrs. E. Hodgkinson, J. Scott Russell, A. Liddell, G. Wightwick, N. Beardmore, C. Vignoles, T. F. Hawkes, Capt. Tayler, R.N., Messrs. P. Clare, R. Roberts, J. Whitworth, G. Rennie, T. Bergin, R. Grantham, J. Grantham, W. Stuart, R. Dymond, W. Jessop, Capt. Pringle, R.E.

J. Taylor, Esq., President, in the chair.

The first paper brought before the Section was the Report on Railway Constants, by Dr. Lardner. The facts in this paper were presented to the Section,

and reported by us very fully, with diagrams, in the year 1839 (*Athen.* No. 619); but as the communication was then merely verbal, and the rules of the Association require a written report, the Report was now formally presented, and the reading led to a good deal of discussion, but no new facts were elicited.

'Remarks on the Connexion which exists between Improvements in Pitwork and the Duty of Steam-engines in Cornwall,' by Mr. Enys.

After adverting to the admission of the truth of progressive increase of duty, it was shown that considerable changes have been made in the course of seventy years, in the methods by which water is lifted out of the mines in Cornwall; and that in comparing the duty of earlier periods, an allowance of the difference of the Imperial and Winchester bushel of coal ought to be made. The distinction between horse-power and duty, pointed out by Mr. Parkes, was alluded to: one excludes, the other includes, the friction of the pitwork; and the remarks attached to each in Lean's report, show the necessity of adverting to the different conditions of the pitwork, in an attempt to estimate with accuracy the relative merit of different engines separate from the pitwork. In an endeavour, some time ago, to trace the causes of the great variation of the duty, a small amount of expansion was observed in engines remarkable for a low duty, and the reasons assigned were, either weak pitwork—flat rods—heavy load per square inch on the piston, and old boilers—and often the joint action of the above causes. The strength of the pitwork, or of the boilers, in different cases, seems to become the limit of expansion in the engines. In reference to deficiency of water from pumps, in proportion to the calculated quantities, on which duty is founded, two causes have operated in inducing a strong belief that it is less than at any former period:—1. Greater attention to the pitwork by the managers of the mines, under whose care it is placed, to the exclusion of the engineers of the steam-engine by which it is worked; 2. The extended use of the plunger pump,—the latter instantly showing the slightest defect of the packing, and allowing of an easy remedy; while the bucket pump, on the contrary, does not show the defects in the packing; and the operation of tightening it is attended with great difficulty,—so much so, as often to cause the repairing to be delayed to the last moment that the pump will lift water. The first cause, though it has a tendency to decrease duty in proportion to improved water delivery, has in a still greater degree the tendency to reduce the friction of the pitwork on a given load: yet it is not easy to assign the exact values. On the whole, a reduction of total resistances probably occurs in shafts of equal depth. On the other hand, the great increased depth of many shafts obviously produces a greater proportional friction on a given load. Under these circumstances, it becomes the fairer method to select the duty of engines working the deepest shafts, for a comparison with the duty of the earlier periods, when engines were worked so differently as regards the steam. Mr. J. W. Henwood (Wheal Towan) estimates the deficiency of water delivery at 7 or 8 per cent.; Mr. T. Wicksteed (E. Holmbush) 10 per cent. water from three lifts measured and weighed; Mr. Enys (Eldon's engine, United Mines), 4 per cent., measured four strokes of the engine from one plunger lift. The absence of attention in earlier times can only be assumed from the known habits of the miner, and the absurd stories prevalent of particular instances of neglect. Another great, but almost inappreciable change, has occurred within the last ten or fifteen years, in the increase of weight in the rods for a given load; but the circumstance of the greater weight of such rods again allowed of the reciprocal action of a still greater amount of expansion in Watt's engines; and in the heavy pitwork, the accumulated force stored up at the commencement was restored at the end of the stroke; the only loss in duty arises from an increase of the friction of the necessary balance weight; because, while a direct gain is obvious, the same mean power, by a greater amount of expansion, is obtained from a smaller quantity of water expended as steam. The present form of rod, with lifts alternately, where the shaft admits of this method, was probably due to Watt or Murdoch. Smeaton, at the Chacewater Atmospheric Engine, in 1775, seems to have effected the introduction of one rod for a portion of the shaft, and dispensed with the older practice of tying up to the arch of the beam a separate rod for each lift. The plunger pump seems to have effected another change of some importance, in the velocity with which the larger portion of water is raised. The engines are usually made to go, out of doors, at rather more than half the velocity of the in-door stroke, the piston moving in-doors from 240 to 260 feet, and out of doors from 144 to 156 feet per minute; the velocity of the plunger, or bucket, is usually four-fifths of these amounts, or 110 to 120 feet per minute. Still a portion of the water, from one-third to one-sixth, is raised at three-fourths of the higher velocity; and recently larger valves have been placed below the plunger than above, with a view of equalizing the resistance of the water on passing the valves. A few experiments of trying an engine in-doors at a very low velocity have been made, which may perhaps be extended, to determine the increase of pressure due to different velocities of water in the pumps. The column of mercury, however, only becomes the measure of the total resistances of all kinds, which are subsequently, as far as practicable, to be separated, and values assigned to each as nearly as our means of observation admit. In commencing motion, after the state of rest to which pumping engines are brought, it is possible a greater power may be employed than is required to continue it. Still the term variable load, formerly adopted by the writer of this paper, may be too strong, and the rapid action of the mercury may render it inappreciable. In an attempt to value friction by the area of the rubbing surfaces of the packing of the plungers, it appeared the unanimous opinion of many of the best pitmen, that water could be kept from escaping with less friction by means of twelve-inch packing than with nine inch packing, in a twelve inch plunger-lift,—a circumstance that requires attention, not only in this, but probably under numerous other conditions. In regard to the effect of expansion on the pitwork, in producing a variable strain during the load, it was observed, that with twelve times expansion on an engine recently erected, of Watt's construction, including clearance steam, the variation was as 8 to 1 at the end of the stroke; but that in a new engine of combined cylinder, by Sims, in which the expansion after three times in a smaller cylinder in-doors, was increased about four times out of doors into a larger cylinder, and which power was converted in-doors into a constant quantity by means of a balance, the variation would be about as 2 to 1; and in Hornblower's or Woolf's, if worked with high steam, that under the condition of twelve times expansion, including clearance steam, the variation might be roughly taken as 3 to 1:—that the commercial part of the question of more or less expense in engines or pitwork, would determine the relative advantages, on the whole, of each engine for lifting water from deep mines. It seems that expansion has not been carried out to so great an extent when the load is near the end of the beam, and when the enormous balance weights, usual in Cornish pitwork, are not required to be applied, though it is obvious that this condition causes less pitwork friction.

GENERAL MEETING.—THURSDAY EVENING.

THE first General Meeting took place on Thursday evening, at the Town Hall, Devonport. After a few words from Col. Sabine, explaining the reason of the non-attendance of the President of the past year, the Marquis of Breadalbane, Prof. WHEWELL took the chair, and delivered an address to the following effect:—

GENTLEMEN,—It now becomes my business to take upon myself the office of President of the British Association, in virtue of my election to that situation, which took place at the meeting at Glasgow last year in the usual form. The election was made in my absence, and contrary to my expectation; but of my own views and feelings with regard to the wisdom of the choice then made, I shall not say one word. I will only remark, that any apprehension which I may entertain of my own unfitness for this office, and of the superior claims of others to the distinction, will have no other effect than that of making me more diligent and scrupulous in the discharge of my official duties, since those are the merits which are most within my reach, and for the want of which no eminence, either in science or in society, can compensate. It cannot but occur to those who are acquainted with the proceedings of the Association in past years, that it would be agreeable to the general course of its usage, if this chair were occupied by some illustrious man of science belonging to this region of England, (the region does not want for such as by their powers and their European reputation might fitly be placed at the head of any scientific association in the world); or again, if it were occupied by some of those men of eminent rank and influence in the district and in the empire, who have shown, by their attendance here and by their services rendered to this meeting, their approbation of the objects of the British Association, and their good will towards its members. But if you had met under a President whose claims to your attention, however high, were of a merely local nature, while at the same time no one of the primary officers of the last meeting, the President and Vice Presidents, were present, to transmit into his hands, by a visible act, the dignity of which I have the honour now to be the temporary holder, it might seem as if the continuity of the Association had been interrupted,—as if this were rather a new institution, arising in this district, than a new meeting of a body which has had, now for eleven years, a connected and unbroken existence. My hand may serve at least to transmit the torch from one place of assemblage to another,—to bring the sacred fire which has been lit and kept alive at the former meetings of our body, and to place it upon the altar which has been erected in this great maritime town. On one account, at least, I may venture to undertake such a ministry as this: I have been a faithful attendant upon the meetings of the Association ever since its first institution, and there is scarcely any subordinate office of labour or dignity in the constitution of the body which I have not at one place or other discharged, with such zeal and care as was in my power. However the Council may have judged well or ill in this selection, they have at least this excuse, that they have not gone out of their way to make it;—that they have not placed in this high office of the Association one whose willingness to serve it, and to be for the time identified with it, was at all doubtful, so far as past events could prove it.

In proceeding to the business of the Association, it is not my intention to attempt to give you any account of the arrangements and prospects of the present meeting, nor of the proceedings of the last, and the transactions of the intermediate time. In several preceding years, there has been laid before the first general meeting of the Association a statement of the main contributions to science, which were included in the recent Proceedings of the body,—a survey and estimate of the scientific work done during the twelvemonth. This is a task always difficult, and sometimes long; and I believe many of you, who know the character which it almost necessarily assumes, of a collection of abridgments of papers on abstruse points of science, will not regret its being occasionally omitted. But perhaps I may be allowed to occupy you for a few minutes with a slight sketch of the general aspect which the Association now appears to me to offer to a thoughtful spectator;—of the place it holds among the characteristics, and I may say, the institutions of our time and country. Such a view of our position may serve to remind us of our duties to the Association, and to the great cause which it represents, and may guide and animate us in the discharge of them.

Those of you who are acquainted with the writings of the greatest of our philosophers, are aware that several of them who have contemplated the past progress and future prospects of science in that spirit of comprehensive thought and large hope, which the subject so strongly calls for, have imagined some vast institution, by which the advance of science should be systematically and powerfully aided;—some great Philosophical College, which should have for its business, not to teach mainly, but to make discoveries—to extend our knowledge of every part of nature by all the appliances which experiment and theory, observation and calculation, ingenuity and perseverance, can supply; and in addition to these, by more material resources, money and a multitude of fellow labourers. You recollect, perhaps, the great Bacon's remarkable picture of the *New Atlantis*. The imaginary teacher, whom he introduces as one of the sages of this Utopian region, describes to the inquiring traveller an institution which he calls *Solo-*

mon's House, and which is such a college for making discoveries, as we have just spoken of. Of this institution, he says, "The end of our foundation is the knowledge of causes and secret motions of things, and the enlarging the bounds of the human empire to effecting of things possible." As parts of this house, there are described caves and wells, chambers and towers, baths and gardens, parks and pools, dispensatories and furnaces, and many other provisions for experiment and observation. There are also many classes of persons who conduct the business of this college, and whom, according to their employments, he calls by somewhat fanciful names—*merchants of light; mystery men; depredators; pioneers*, or *miners; compilers; dowry men*, or benefactors; *lamps; inoculators*; and finally, *interpreters of nature*, who elevate the truths of experiment into general laws, the highest forms of human knowledge.

Other philosophical writers have presented, in various ways, somewhat of the same conceptions. But, you will perhaps say, all this is mere imagination. Such an institution exists only in Utopia: it was never contemplated as a reality. True: it is ideal, just as all the highest forms of human institutions are ideal. It is Utopian, just as a perfect monarchy, perfectly administered, is Utopian. But if we conceive a perfect monarchy, where the sovereign has unlimited power, which he exercises with entire wisdom and justice, while the resources of the state are ample, and the character of the nation is intellectual and progressive, must we not, in such an Utopia, include also the notion of such a college of discovery? Beyond all doubt, if we imagine to ourselves a New Atlantis, we must also place in it a Solomon's House. Still, you will say, all is imaginary—and to what use do we feed our minds with these empty pictures of unattainable good? To what use, do you ask? Some of you, well aware that, in the constitution of man, imagination and hope,—the boldest imagination, the loftiest hope,—are not without their use—aware what that use is, have already answered this question in your own hearts. Of what use are the ideal pictures of objects that tend to elevate and improve the condition of man? Of that use, which, if we disregard, the condition of man forthwith becomes degraded, and his prospects a blank. They are of use in raising our thoughts and stimulating our exertions, so that we may become wiser, and better, and nobler than we are? Is this a new doctrine? God be thanked, in this country at least, it has long been familiar to men's minds—has been practically acted upon, and has been attended with the most blessed and glorious effects. Let us look to other objects, very different from the increase of knowledge, and we shall easily discern the operation of this doctrine. It is not difficult to see in what form we may expect to find it showing itself. For if we imagine this Utopia of a perfect government, Solomon's House will not be the only ideal institution there. In such a land of justice, and wisdom, and religion, we shall have colleges for diffusing justice, and wisdom, and religion over the face of the earth. We shall have a college for teaching the poor, a college for repressing the vicious, a college for the abolition of slavery, a college for diffusing Christianity over the face of the globe. Such colleges we should have in our Utopia—but Utopia is not. What then? do we therefore despair of these great objects? Do we sigh to think that all this contemplated good is mere imagination? Do we lament that we are not in an absolute monarchy, where the wisdom of the sovereign, supported by unlimited power, might call into existence those beneficial institutions? Do we despair of these great and good objects, because we live in a state of society where men act each for himself, unforced by supreme power? Do we cast away our ideas, because we are not likely to be carried towards their realization by the whole power of the state? Do we do this; or do we not do something very different? Something very different indeed we do. We still keep our thoughts fastened upon our ideas of what is highest and best; but feeling that we are free, and that it is our glorious privilege to act as freemen, we attempt to realize our ideas, not by the power of the state, but by that power which, in such a state and on such subjects, represents the conviction of the nation, the power of voluntary association. We have had thus,—not state colleges, but voluntary societies,—for Christianizing the Heathen, for teaching the ignorant, for repressing the vicious; and we *had* a voluntary Society for the Abolition of Slavery, till the principle of voluntary association, in that instance, thank God! performed its work even to the end, by inducing the State to take up and carry into effect the great object which had been the aim of the voluntary society from its foundation.

What, then, is the conclusion to which we are led, by looking at the spirit of our country, as shown in its most strenuous exertions and most glorious acts, and combining this view with the loftiest ideal aspirations of the greatest philosophers the land and the world have produced? What but this: that with regard to that institution, which has for its object to extend the bounds of human knowledge, we must realize the idea in the same manner as we endeavour to realize other ideas in our practice;—that what in a perfect monarchy would be done by a wise sovereign, we must do by voluntary exertion;—that in the place of a Solomon's House supported by the State, we must have a British Association supported by ourselves.

The British Association has now for ten years discharged the office of such an institution as we have spoken of. Considerable funds, raised by the contributions of its members, and expended under its direction, have been employed in furthering and verifying discoveries. It is true that we have not attempted to erect such edifices, and to make such preparations for the purposes of experiment, as Bacon introduces into his picture: but we have attained the same end more effectually, by procuring the use of many of the great establishments of manufacture and commerce which this empire possesses. We have had experiments carried on at furnaces and iron-works, on railroads and canals, in mines and harbours, with steam engines and steam vessels, upon a scale which no institution, however great, could hope to reach; but which has been placed in our power by the enlightened liberality and scientific zeal of the proprietors and directors of such means of research. We have not had various bodies of professors of the art of discovery employed in these inquiries—we have not attempted to form classes of mystery men and dowry men—collectors of facts and interpreters of nature;—but we have found the most gifted and eminent cultivators of science in our own country, and several of those of other countries, ready and willing to undertake for us the office of exploring and interpreting nature—of extending and applying art. No institution, however formed, could have hoped to collect, as its active members, such a body of philosophers as have gladly come forward to labour for us, and have freely given us the resources of their vast powers and matured skill. Mathematicians, and astronomers, and geologists, and chemists, and naturalists, illustrious through Europe, have superintended the execution of our commissions with as much care as their own most favourite researches; and we have seen a co-operation of experimenters and calculators, observers and generalizers, such as might satisfy the wishes of Bacon himself.

That I may not dwell on mere generalities, I will mention a few of the sums expended by the Association upon scientific researches; which, when it is understood that they have been spent under the direction and vigilant control of such men as I have spoken of, will show the amount of service which has been rendered to science by that body. In the first three years, the sums thus expended were small, the Association having been mainly employed in collecting information which might direct its future proceedings. In the fourth year 167*l.* was thus spent, and from this time the sum went on rapidly increasing. In the fifth year it was nearly 500*l.*; in the sixth and seventh nearly 1,000*l.* each year; in the eighth and ninth above 1,500*l.* each year; and it appears that during the past year we have expended in this manner the sum of 1,240*l.* And these sums, it is to be observed, are only a part of what were voted; at Liverpool, in 1837, above 3,000*l.* was voted, of which 1,000*l.* only was applied for; at Newcastle 3,700*l.* was voted, and 1,600*l.* of this only paid; at Birmingham 2,800*l.* was voted, and 1,500*l.* paid; the sum voted at Glasgow last year was 2,600*l.* of which, as I have said, your treasurer has really paid 1,240*l.*

These differences of the sums voted and paid in each year are evidence of the care with which the resources of the Association are husbanded; for the sums voted were to be had on application made by the persons to whom their disposal was intrusted; but they were not applied for, except in proportion to the scientific work which was done; and those who undertook these labours for us carefully confined their expenditure within the narrowest possible limits. It would occupy you too long if I were to mention in detail the subjects to which these sums have been applied; but I may state in general, that above 900*l.* has been expended by us in the furtherance of Astronomy, mainly upon the object of reducing observations already made, into such a form that they can be directly compared with the theory. Above 800*l.* has been expended on Tide observations; 250*l.* on experiments on Waves; 500*l.* on experiments on the best Form of Vessels; 200*l.* on experiments on Cast Iron; about 400*l.* has been employed in various labours relative to Meteorology; and above 300*l.* on the description of Fossil Fishes and Reptiles. I shall not detain you by mentioning smaller sums which have been devoted to various objects: but I may call to your notice a work executed mainly in this county, upon which the Association expended about 550*l.* in 1838 and 1839. This work consisted in striking a level line from the north coast of Somersetshire to Exmouth, in order to determine whether the level of the sea is the same in the Bristol Channel and in the British Channel, and in order to afford a standard of reference in future times, if, from any cause the relative level of the land and the sea should change. This operation has already afforded us the means of determining, that the great land slip, which has recently taken place near Axmouth, was not accompanied by any permanent change in the level of the land itself, where a block of granite lies, which marks one of the extremities of our level line.

Since the first institution of the Association, about 7,000*l.* has been expended on such objects as I have pointed out: but it is impossible for any one, who knows the nature of scientific researches, and the difference between the result of money expended in experiments by a good and a bad philosopher, to doubt that this sum has produced effects which many times the sum applied without the same advantages could not have obtained. Without the encouragement of the Association, these researches would never have been undertaken: without the aid of such men as have frequented the meetings of the Association, they would have been attempted to no purpose. It has been said of certain parts of Europe that they afford—

> Iron and men, the soldier and his sword;

in like manner we may say of this Association, that it has supplied at the same time the philosophical soldier and the weapons with which he gains his victories over nature.

But further, besides the expenditure of its own funds, the Association has been the means of procuring the appropriation of very large sums to scientific purposes from the national resources. At the suggestion or request of their body, the reduction of the observations of the planets made at Greenwich from the time of Bradley has been completed; and the reduction of the observations of the moon has been begun. Up to the present time, about 2,200*l.* has been expended in all. And by a letter from the Astronomer Royal, received since I came here, I am informed that, within a few weeks the Government expressed great willingness to advance more money for this purpose; and Mr. Airy adds, that next Monday he is to have twelve calculators employed upon the work. We have applied to the Government for the extension of the Ordnance survey into Scotland, and have received a favourable answer. We have tendered our advice that the Ordnance survey of England shall in future be conducted on a scale of six inches to a mile instead of two inches, and this advice is already acted on in the northern counties of England, where the survey is now proceeding.

Above all, I must mention an undertaking, entered upon in pursuance of our repeated recommendations (a service which the philosophers of future ages will duly estimate),—the great Magnetical Survey of the terrestrial globe, by the combined operation of a naval expedition and fixed

observatories in every quarter of the world, which is now carrying into effect;—a scientific work, this—far surpassing in the scale of its means, and in the completeness of its design, any ever yet attempted, and such as Bacon might have assigned to the sages of his New Atlantis, if he had, in imagination, extended their polity from the Atlantic to the Pacific, and from Pole to Pole.

We most gladly bear our testimony to the liberality and spirit with which Her Majesty's Government have accepted and acted upon our suggestions; nor is this testimony at all weakened by our claiming for distinguished members of our own, the merit of having brought into view the importance of such an undertaking, laid before the English public the progress which the subject was making in other countries, planned the scheme of operations which our own exertions ought to follow, and animated the observers, by giving them the certainty that their observations will be well used and fully appreciated.

When we can point to these numerous and valuable direct results of our exertions, we cannot at all waver in our conviction that those persons acted in the truest spirit of the age, and of the nation, who, eleven years ago, framed the design of a voluntary association for the advancement of science among the subjects of this empire: and that the hopes and expectations which such an institution might naturally exercise, have been fully verified by the course and progress, the labours and successes of the British Association.

I do not doubt that the present Meeting will continue to uphold the character of the Association, and will be inferior to none of the preceding in the value and interest of its proceedings. We are not yet likely to want for matter to labour upon. The collection of facts and the reduction of them by various calculations is still required to a vast extent, in order that our knowledge may make the next step of progress to which its path invites our hopes.

It is easy to point out vast fields of research, on which our resources and our energies may be applied with every prospect of a rapid increase of knowledge. For, in fact, how little has been done for science, by the collection of exact and long-continued series of observations, such as he must have before him who is to interpret nature. In astronomy, indeed, this has been done: sovereigns, and nations, and opulent individuals have thought their wealth well bestowed in providing costly instruments, and rewarding the astronomer through his daily and nightly toils. The stars have been well observed from the beginning of civilization; but, for the purposes of science, we ought to have observations as careful and as continued of all the other parts of nature as we have of the stars. The tides, the waves, the winds, and all the other changes of the air, pressure, temperature, moisture, magnetism, electricity, chemical changes, and even those of vegetable and animal life,—all these afford materials for researches full of importance and interest. For these, the time is, perhaps, not yet come, when they can be urged upon governments as a part of their business, in the same way in which astronomy is;—except, perhaps, magnetism, which has already taken its place in our observatories by the side of astronomy, in our own and other countries. Those other subjects, then, are fitly cultivated by a voluntary association such as ours; and the occasions of fitly doing this will doubtless be suggested to us from time to time by our members. On the present occasion, a distinguished Belgian philosopher, one of our Corresponding Members (M. Quetelet), comes to us to invite us to take a part in determining, by extensive observations, the changes which atmospheric conditions produce in periodical phenomena,—such as the times of the leafing and flowering of plants, of the arrival of birds, and the like. He has obtained extensive co-operation in his own country, and no doubt will find fellow-labourers in ours. Meteorology, in its largest sense, is a subject, which, although great collections of observations have been made, is hardly yet a science: yet the interpreters of this part of the book of nature have already begun to spell out some phrases, which show that the language is not wholly unintelligible; and here, therefore, we may go on hopefully, recollecting always that the collection of facts is a matter of comparatively small value, except we can also trace in them some rule or order. The mere gathering of raw facts may be compared to the gathering of the cotton from the tree. The separate filaments must be drawn into a connected thread, and the threads woven into an ample web, before it can form the drapery of science.

We ought to have meteorological observations and observers distributed over the face of the globe: and even this would not be enough; for we wish to know not only what passes on the earth's surface, but through the whole depth of the atmosphere; hence it would be desirable to have observations made at elevated points free from the action of the ground—such as can only be attained by the aid of balloons. Such an undertaking has been under the consideration of a committee during the past year, and a report on the subject has come before the Physical Section. I trust that on this subject you will *soon* hear more. As other subjects on which we still want facts—that is, numerous and systematical collections of facts, and laws deduced from facts—I may mention the tides of the Pacific, the velocity of sea waves, and subterranean temperature. Another class of inquiries well fitted for our labours, is the determination of the fundamental elements, or *constants*, of operations of engineering, as the constants of railroads, steam-engines, and other works of art, which form part of the wealth and resources of this great empire. These are already under investigation. The addition of a Section of Practical Mechanics and Engineering to the previous constitution of the Association, which took place at Bristol, showed the interest which such inquiries inspire; and various committees have collected much valuable information of this kind, and will, we trust, collect much more.

There is also another Section of the Association, added to its plan at Cambridge, which has for its object researches of a highly interesting kind,—I mean the Section of Statistics; and we trust that there is ample employment for this Section, in subjects which can be dealt with in the same calm speculative spirit as the other sciences which we here cultivate.

It may, perhaps, sometimes be useful to us to recollect that in many statistical subjects, the discussion and even the collection of facts is rather the office of a legislative than of a scientific body. The wise institutions of Bacon's New Atlantis would have assigned to the governors of the land, and not to the sages of Solomon's House, the collection of information respecting the habits, numbers, and education of the people; where the information is such as almost necessarily suggests legislation, or discussions having legislation for their natural end, and involving the deepest political and moral considerations. There may very fitly be voluntary associations, which aim directly at improving the intellectual, or moral, or social condition of our population; but we must ever remember that we are an association for a different purpose, namely, the advancement of science; and we are bound alike by our regard to the prosperity of our body, and by our most solemn and repeated declarations, to avoid the storm of opinions which is always raised when the parties which aim at social permanence and social progress are brought into conflict. The pursuit of scientific truth is, no doubt, a means of *indirectly* elevating man's intellectual and social condition; but we assemble in order to promote the *direct* pursuit of scientific truth; and we must not turn aside into the more wide and tangled paths of those who make its collateral effects their main object. Knowledge is power, we are told. Knowledge *is* power; but for us, it is to be dealt with as the power of interpreting nature and using her forces; not as the power of exciting the feelings of mankind, and providing remedies for social evils, on matters where the wisest men have doubted and differed.

Being the person whose voice is first raised in addressing the meeting of the Association, I have thought that it was a part of my duty to use the opportunity in calling to our minds the fundamental character and principles of our Institution. There are other subjects which our constitution directs us to avoid; but none perhaps in which there is much danger or need of warning. We are in no great risk of deviating into literary, or metaphysical, or theological discussions. Some metaphysics and literary culture will of course show themselves in the addresses of those who possess such accomplishments, but are no direct objects of our attention. And in like manner, though we cannot dream of the slightest approach to the discussion of religious questions, heartfelt and real piety may be apparent even in the sentiments uttered at an association for the advancement of science. I am sure that many of you who attended the former meetings of this Association, must recollect occasions on which men's minds being excited, and yet solemnized, by the aspect of the assembled multitudes, and by the lofty views of nature which our philosophers had to present to them, the thoughtful and eloquent men who had to address you were carried by a spontaneous impulse, without plan or premeditation, into elevated strains of religious reflection; showing that those who take the lead in our meetings have their minds so tuned, that every voice which proclaims the wonders of nature, turns their thoughts to the Author of nature: that every new gleam of truth seems to them an effluence from the eternal fountain of truth. Long may such habits of thought prevail among the philosophers of this land; and then we need not fear but that knowledge, hallowed and elevated by the spirit in which it is pursued, will be every way a blessing to man,—to his soul as well as to his body—to his spiritual as well as to his intellectual being.

To those of us who, knowing the institution by our attendance upon it, and our share in its labours, think thus of its value and its spirit, every new annual occasion of our coming together, must be an occasion of fresh gratification, an agreeable exercise of memory and of hope. In our present meeting at this place, there are many circumstances to give additional animation to our anticipations of pleasure. We come to a part of the empire hitherto unvisited by many of us, to a great maritime town, replete with objects of amusement, art, and interest. We know the love of science and the familiarity with its treasures which here prevail, for we are acquainted with the high character, the knowledge, zeal, and ability of the authorities of the Dockyard—the intelligence and activity of the Plymouth Institution;—we know and feel most gratefully, the kind and vigilant care with which preparations have been made for our reception; and we now see in this assembly, the look of cordial welcome and lively anticipation, of which I would say more, but that I would beg to leave the subject in abler hands. We hail with joy and confidence, the opening of the Plymouth Meeting of the British Association.

Perhaps you will allow me the gratification of saying a word, respecting special personal reasons of my own, which make it a matter of pleasure to me to find myself here on this occasion. Besides that it brings me to the society of several valued and cherished friends, whose home is in this part of England, I have various ties of a scientific nature with this place and this region. The excellent observations of the tides made in this harbour, have been the subject of calculations involving considerable labours, which I have made or directed: and some curious traits in the laws of tidal phenomena here, which were noticed as early as the time of Newton, have, I trust, been followed out to a tolerably exact determination. An anemometer, which I had devised, has been erected here, with most valuable improvements, by Mr. Snow Harris, and has been for some time in operation. And when I consider, as we may do, this meeting as a meeting peculiarly intended to bring the Association in contact with the west of England, I find that Cornwall returns to my thoughts, with all the scientific zeal and intelligence, which from my own personal intercourse I know to exist among the miners of that county. Perhaps I have had very unusual opportunities of becoming acquainted with their merits, for in two different years (1826 and 1828) in the prosecution of certain subterraneous experiments, undertaken in conjunction with the present Astronomer Royal and other persons, I lived four months the life of a labouring miner, and learnt how admirable for skill and conduct is the character of all classes of the mining population in that region. If any of my Cornish friends are within hearing, I gladly bid them God speed, and claim once more their welcome to the west. And that I may no longer detain you, to all of you, gentlemen of the British Association, I bid God speed; and from all of you, gentlemen of Plymouth and its neighbourhood, I seem to hear, Welcome to Plymouth!

The Marquis of Northampton, P.R.S. then moved

a vote of thanks to the noblemen and gentlemen of Devon and Cornwall who had given their support to the Association. He also alluded to the Magnetical Survey of the terrestrial globe, now in progress, as, in his opinion, more important than even the chairman had stated; for so many nations had co-operated in the great and good work, that its moral influences could not be considered as subordinate to any scientific results which might be anticipated; and he pleasantly adverted to the Niger Expedition, which had lately sailed from this country, as the first step, perhaps, towards the establishment of a Society for the advancement of science at Timbuctoo: this, he said, might be thought Utopian, but Cæsar would have thought such an Association in Britain quite as Utopian.—The customary thanks were also voted to the local officers and to the President.

SUMMARY.

Our Report of proceedings in the Sections will be continued regularly until complete. In the meantime we shall record, in a few paragraphs, such an account of the general business and pleasuring of the week, as concerns or is likely to interest the public.

The first General Meeting was, as usual, held on Thursday evening, in the Town Hall, Devonport, and the President's Address will be found fully reported in another part of this day's paper.

On Friday evening there was a *soirée* at the same place, when Mr. Chatfield, of Her Majesty's Dockyard, gave a lecture, with illustrations, on the construction and launching of ships,—a subject well chosen with reference to the locality, and to the launch of the *Hindostan*, which was arranged to take place on the Monday following.

Saturday was "a whole holyday," and the Members visited, as their taste directed, the interesting objects and localities in the neighbourhood,—Mount Edgecumbe, Saltram, Port Eliot, the Dockyard, and other public and national establishments. Steamboat parties made excursions to the Breakwater and the Eddystone. Some few of the members ascended the Tamar, and all who reached the Weir Head, and visited Cothele, were enthusiastic on the subject. The Geologists visited the mines in the neighbourhood of Tavistock. This was the largest party, and included Prof. Buckland, Mr. De la Beche, Mr. W. Hamilton, M.P., Mr. Leonard Horner, Mr. Griffith, the Marquis of Northampton, Sir Charles Lemon, and Sir T. Dyke Acland. Several of the Naturalists also took part in this excursion, among whom were Prof. Henslow, Dr. Richardson, Mr. Richard Taylor, Rev. W. S. Hore, and Dr. Lankester. In crossing Roborough Down, the Geologists were attracted by the well-known Roborough Rock, an interesting example of those large quartzose dykes which traverse the slates of this district; and on reaching the brow of the hill on Grenofer, a quarry by the roadside exhibited a portion of the large granitic Elvans which seem to connect the granite of Dartmoor to that of Gunnis Lake and Kit Hill in Cornwall. The mines selected for the visit were, Wheal Friendship and Wheal Betsey, situate about four miles north of Tavistock. Mr. John Taylor, who is one of the adventurers in these mines, and directs their management, received the party on their arrival, and with his son, Mr. R. Taylor, jun. pointed out and explained the machinery employed in draining the mines, and drawing the ores to the surface, as well as the various processes employed in separating the metallic ores from the portions of rock with which they are mixed when brought out of the mine. The lodes, or veins, of Wheal Friendship, which is a copper mine, run east and west, while that of Wheal Betsey, a lead mine, runs north and south, intersecting and heaving the Wheal Friendship veins. The machinery used at these mines, and in the processes carried on above, are similar to those in use in the mines of Cornwall; possessing, however, a somewhat peculiar feature, in the amazing amount of water-power which has been rendered available by a system of water-courses, extending into the valleys on the flanks of Dartmoor and Black Down.

On Sunday, sermons were preached by Prof. Whewell, Dr. Byrth, and the Rev. W. D. Conybeare, for the benefit of the Orphan Asylum.

The launch of the *Hindostan* was the attraction on Monday. Many of the members were stirring early, and present, at eight o'clock, when preparations were made by lifting the vessel. At five she was christened by Mrs. General Ellis, and then launched amidst the cheers of assembled thousands, though it poured in torrents. Every accommodation was afforded to the members, and such as had not secured places were admitted on board the guard ships on exhibiting their tickets.

Tuesday evening, notwithstanding the unfavourable state of the weather, the *soirée* was well attended. In the course of the evening Dr. Reid gave an account of his system of ventilation, Mr. Dent described Prof. Wheatstone's electrical clock, Mr. Brunel gave an account of the Thames Tunnel, and Mr. De Moleyns described a new voltaic battery.

GENERAL COMMITTEE.

MONDAY.

The General Committee met at two o'clock, the President in the chair. Invitations were received from Manchester for next year, and from York for the year 1843. The Manchester invitations were from the Town Council, the Boroughreeve and Constables, the Commissioners of Police, the Literary and Philosophical Society, the Agricultural Society, the Royal Institution, the Botanical Society, the Medical Board of the Infirmary, the Statistical Society, the Geological Society, the Medical Society, the Mechanics' Institute, the Victoria Gallery of Practical Science in Manchester, and the Royal Institution of Salford.

It was moved by Col. Sabine, and seconded by Mr. John Taylor, that the meeting be held in Manchester, which was agreed to unanimously.

The following list of officers was then proposed and agreed to:—*President*, Lord Francis Egerton.—*Vice Presidents*, Dr. Henry, Dr. Dalton, Prof. Sedgwick, Sir B. Heywood.—*Secretaries*, Mr. P. Clare, Dr. Fleming, Mr. J. Heywood.

It was resolved that the meeting should be held in June, the exact day to be fixed by the Council; and that the Council should nominate the Local Treasurer after consultation with the gentlemen of Manchester.

Mr. Hamilton was added to the Committee of Recommendations.

WEDNESDAY.

The Committee assembled at 3 o'clock. The officers of the Association were re-appointed, and the following gentlemen elected the Council for the ensuing year:—G. B. Airy, Esq., H.T. De la Beche, Esq., R. Brown, Esq., Dr. Buckland, Sir D. Brewster, Dr. Daubeny, Sir P. Egerton, Prof. Forbes, Prof. T. Graham, G. B. Greenough, Esq., Leonard Horner, Esq., W. J. Hamilton, Esq., R. Hutton, Esq., Rev. V. W. Harcourt, Rev. Prof. Lloyd, the Dean of Ely, Marquis of Northampton, Dr. Robinson, Dr. Roget, Dr. Richardson, Sir J. Robison, G. Rennie, Esq., R. E. Strickland, Esq., Col. Sykes, Prof. Wheatstone.

The following grants, having received the sanction of the Committee of Recommendations, were adopted by the General Committee.

	£.	s.	d.
Section A.			
Observations on tides in Bristol	20	0	0
Reduction of stars in L'Histoire Céleste	65	0	0
Completing the Catalogue of the Astronomical Society	110	0	0
Reduction of stars in Lacaille's Catalogue	105	0	0
Observations on velocity of waves	30	0	0
Publication of hourly meteorological observations made at Plymouth, should the Government refuse to bear the expense	250	0	0
Experiments on the atmosphere with captive balloons	250	0	0
Anemometer at Inverness	40	0	0
Action of media on solar spectrum	40	0	0
Simultaneous magnetic observations	100	0	0
Observations on tides in the Pacific Ocean	60	0	0
Hourly observations at Inverness	65	0	0
Velocity of wind at Plymouth	10	0	0
Whewell's anemometer at ditto	8	0	0
Osler's ditto	25	0	0
Hourly observations at dockyard, ditto	40	0	0
Publication of foreign scientific memoirs	88	18	0
Reduction of meteorological observations	75	0	0
Nomenclature of stars	32	0	6
Total	1,433	18	6
Section B.			
Physiology of digestion	200	0	0
Action of light on seeds	15	0	0
Total	215	0	0
Section C.			
Observations on mud in rivers	20	0	0
Collection of railway sections	150	0	0
Solution of silica in water of high temperature	25	0	0
Carried forward	£195	9	0
Brought forward	£195	0	0
Registration of earthquakes	100	0	0
Temperature of Irish mines	10	0	0
To aid in the publication of a work on Belemnites	50	0	0
To aid in the publication of an atlas of plates, illustrating Prof. Owen's Report on Fossil Reptiles	250	0	0
Total	605	0	0
Section D.			
Researches on fossil mammalia	200	0	0
Races of Men	7	11	0
Organic beings in mineral waters	6	0	0
Growth of seeds	10	0	0
Preservation of animal and vegetable substances	6	0	0
Dredging operations	50	0	0
Total	279	11	0
Section E.—No grant.			
Section F.			
Inquiries into vital statistics	150	0	0
Section G.			
Forms of vessels	150	0	0
Experiments on the stroke of the piston with Poncelet's apparatus	100	0	0
Indicator to determine velocity on railways	100	0	0
Total,	350	0	0

The whole amount granted for scientific researches was 3,033*l.* 9*s.* 8*d.*

It was stated that out of 2,591*l.* 5*s.* granted last year, only 1,129*l.* 7*s.* 6*d.* had been expended. The recommendations of last year, not involving grants of money, were renewed, with the addition that Dr. Richardson and Mr. Gray be requested to prepare a Report on the Zoology of New Zealand.

The Treasurer reported that 630 tickets had been issued, including those of old and new members; that 260 ladies' tickets had been sold; and that the whole amount received in Plymouth was 1,280*l.*

Messrs. Yarrell, Horner, and Hutton were elected Auditors for the ensuing year.

Colonel Sykes moved, that it be referred to the Council to consider the propriety of admitting children under fifteen years of age, to the meetings of the Association, on the same terms as ladies.

The meeting then adjourned *sine die*.

MISCELLANEA

Newspapers.—In your number of July 10, you gave an abstract of a paper which Mr. Simmonds read before the Statistical Society, upon 'The Statistics of Newspapers.' Mr. Simmonds states that the oldest existing provincial newspapers are,—the *Lincoln Mercury*, 1695, the *Ipswich Journal*, 1737, &c. Mr. Simmonds ought, however, to have placed the *Worcester Journal* (which is now published in this city,) the second on his list, that paper having been commenced in 1709. I have, in my possession, No. 85, Feb. 2, 1711. The original title was the *Worcester Postman*, but, about fifteen years after the first publication, the present title was adopted.—I am, &c., H. B. Tymbs.

Worcester, July 31, 1841.

New Oxide of Iron.—This combination has been obtained by M. Fremy. It communicates a violet colour to water, and possesses a powerful dyeing principle. It resembles manganese chameleon. It decomposes readily when boiled with an alkali or organic substance having an affinity for oxygen, and is converted into oxygen and sesqui-oxide of iron, of a yellow colour. This combination is a perferrate of potash, which may be procured by calcining peroxide of potassium and peroxide of iron. Fremy has shown that the appearance of a chameleon colour is no proof of the presence of manganese, as it may be confounded with the new oxide of iron. Fremy forms this oxide by igniting a mixture of potash and peroxide of iron; a brown mass is the result, which, by digestion in water, gives a beautiful violet-red solution. This compound is very soluble in water. A large quantity of water decomposes it in the course of time. It becomes insoluble in very alkaline water, forming a brown precipitate, which readily dissolves in pure water, and affords a fine purple solution. It appears much less stable than manganate of potash. A temperature of 212° decomposes it immediately; all organic substances decompose it. It is consequently impossible to filter the solution. It is impossible to isolate this compound, for when the red solution is treated by an acid, when the potash is saturated, oxygen is disengaged, and peroxide of iron precipitated. If the acid is in excess, it dissolves the peroxide, and gives rise to the formation of peroxide salt of iron.

Glass Church-Bells are among modern wonders. One has just been cast in Sweden; its diameter is six feet, and its tone is said to be finer than any metal bell.—*Tyne Mercury.*

13, Great Marlborough-street.

NEW WORK EDITED BY "BOZ,"

NOW READY.

The Booksellers and the Public are informed that

THE PIC-NIC PAPERS,

BY VARIOUS HANDS,

Edited by CHARLES DICKENS, Esq. (Boz,)

ILLUSTRATED BY CRUIKSHANK, &c.,

IS NOW PUBLISHED, complete in 3 volumes post 8vo., and not in Parts as some persons have erroneously supposed.

HENRY COLBURN, Publisher, 13, Great Marlborough-street.

Third edition.—Now ready, the 6th Part (196 pages), price 3s., of

THE GERMAN MANUAL for SELF-TUITION. By Prof. KLAUER-KLATTOWSKI.

This Part contains the delightful tale of 'Undine,' by Baron De la Motte-Fouqué; 'Die Rosen,' a dramatic picture of German high-life in 5 Acts, by Baron Albini; and Schiller's masterpiece, 'Der Spaziergang'; with Glossary, &c. complete.

*** The preceding five Parts of the Manual (692 pages, price 10s.) may be had of all respectable Booksellers, either separately or together.

Simpkin, Marshall & Co.; and P. Rolandi.

MAVOR'S SPELLING-BOOK.

THE ONLY GENUINE EDITION.

With the Author's final Corrections and Improvements.

Messrs. Longman & Co. respectfully acquaint Booksellers and Conductors of Schools, that they have just published the 447th edition of Mavor's Spelling-Book, with the various revisions and improvements of Dr. Mavor. New types have been cast for it, and it is also illustrated by a Frontispiece, after Stothard, and Forty-four beautiful Wood Engravings, designed expressly by Harvey, which render this edition of Dr. Mavor's long-established and superior Spelling-book the most attractive of any in existence.

London: Longman, Brown & Co.

And sold by all Booksellers in Town and Country.

This day, in 18mo. 1s. 6d. cloth, lettered,

AN ENLARGED EDITION of MURRAY'S ABRIDGED ENGLISH GRAMMAR: containing numerous additional Exercises. By the Rev. Dr. GILES, Head Master of the City of London School.

*** The present edition contains examples and exercises so numerous, that a pupil who has gone through them all may be fairly supposed to possess a very competent and satisfactory knowledge of the subject.

London: Longman & Co.; Whittaker & Co.; and R. Harvey.

Published by Order of the Lords Commissioners of Her Majesty's Treasury.

1.

This day is published, 8vo. price 9s. boards,

FIGURES and DESCRIPTIONS of the PALÆOZOIC FOSSILS of CORNWALL, DEVON, and WEST SOMERSET; observed in the course of the Ordnance Geological Survey of that District. By JOHN PHILLIPS, F.R.S. F.G.S. &c., Assistant General Secretary to the British Association for the Advancement of Science, &c. &c.

2.

1 vol. 8vo. with numerous Sections and Plans. 14s. cloth lettered,

REPORT on the GEOLOGY of CORNWALL, DEVON, and WEST SOMERSET. By HENRY T. DE LA BECHE, F.R.S. &c., Director of the Ordnance Geological Survey.

London: Longman, Brown & Co.

MANGNALL'S QUESTIONS, ETC.

Only Edition as written by, and with last Corrections of, Author.

HISTORICAL and MISCELLANEOUS QUESTIONS. By RICHMAL MANGNALL. 12mo. New Edition, 4s. 6d. bd.

QUESTIONS on the HISTORY of EUROPE: a Sequel to the above; comprising Questions on the History of the Nations of Continental Europe not comprehended in that work. By JULIA CORNER. New Edition. 12mo. 5s. bd.

COMPENDIUM of GEOGRAPHY, for Schools, Private Families, &c. By Miss MANGNALL. New Edition, corrected, 7s. 6d. bd.

London: Longman, Brown & Co.

This day is published, 8vo. with Plates, 14s. cloth lettered.

AN INTRODUCTION to the THEORY and PRACTICE of PLANE and SPHERICAL TRIGONOMETRY, and the Stereographic Projection of the Sphere; including the Theory of Navigation. By T. KEITH. 7th edition, corrected by S. MAYNARD.

By the same Author,

The Elements of Plane Geometry; containing the first Six Books of Euclid, from the Text of Dr. Simson: with Notes, Critical and Explanatory. 4th edition, corrected and improved, by S. Maynard. 8vo. 10s. 6d. bds.

New Treatise on the Use of the Globes; or, a Philosophical View of the Earth and Heavens. New edition, considerably improved by J. Rowbotham, F.R.S. 12mo. with 7 Plates, price 6s. 6d. bound.—KEY, by Prior, 2s. 6d. bd.

*** The only genuine edition.

London: Longman, Brown & Co.

GREEK CLASSICS. Edited for Schools and Colleges.

Homer. Text of Heyne: with English Notes. By the Rev. E. Valpy. 4th edit. 8vo. 10s. 6d.—TEXT only, 6s. 6d.

Herodotus: the Continuous History alone of the Persian Wars. By the Rev. C. W. Stocker, D.D. 2 vols. post 8vo. 18s. boards.

Plato's Four Dialogues: Crito, Greater Hippias, Second Alcibiades, and Sisyphus. By G. Burges, A.M. With English Notes, Original and Selected. 8vo. 9s. 6d. boards.

Xenophon's Anabasis: with English Notes. By F. C. Belfour, M.A. 3rd edit. post 8vo. 8s. 6d. bds.

Xenophon's Cyropædia: with English Notes. By E. H. Barker. Post 8vo. 9s. 6d. bds.

Demosthenes' Seven Orations; with English Notes. By E. H. Barker. Post 8vo. 8s. 6d. bds.

Select Idylls of Theocritus: with English Notes. By Dr. Hickie. Post 8vo. price 6s. cloth lettered.

Longinus on the Sublime: with English explanatory Notes. By Dr. Hickie. Post 8vo. 5s. cloth lettered.

London: Longman, Brown & Co.

COLLEGE and SCHOOL LATIN CLASSICS.

Tacitus. Brotier's Text, with his Explanatory Notes, as edited by A. J. Valpy, M.A., translated into English. 3 vols. post 8vo. 24s.

*** This is the only Edition of Tacitus with English Notes.

Cicero de Officiis; with Critical and Explanatory Notes. Text of Heusinger. 4th edition, 6s. 6d. bound.

Cicero de Amicitia et de Senectute. Text of Ernesti; with Notes, by E. H. Barker, Trin. Coll. Camb. 6th edition. 4s. 6d. bound.

Cicero: Twelve Select Orations. Text of Orellius. English Notes, 2nd edition, 7s. 6d. bds.

Cicero's Catilinarian Orations. Text of Ernesti; Notes, by E. H. Barker. 5s. 6d. bds.

Tacitus: Germany and Agricola. Brotier and Passow's Text; Notes, &c. by E. H. Barker. 5th edit. 5s. 6d. bd.

Cæsar. With Notes, &c. by Barker. Woodcuts, 6s. 6d. bds.

Livy: Books I. to V. With English Notes, by D. B. Hickie, L.L.D. Post 8vo. 8s. 6d. bds.

Catullus, Juvenal, and Persius Expurgati. Used at the Harrow School. Fcp. 8vo. 5s. cloth.

*** Messrs. Longman & Co.'s Catalogue of School Books may be had of all Booksellers.

VALPY'S ELEMENTARY GREEK WORKS.

Greek Delectus; with Notes and a Lexicon. By R. Valpy, D.D. New edition, 4s. bound.—KEY, 2s. 6d.

Second Greek Delectus; with English Notes and a Lexicon. By the Rev. F. Valpy. 3rd edition. 8vo. 9s. 6d. bd.

Third Greek Delectus: with English Notes. By Rev. F. Valpy. Price 15s. 6d. bound.

Separately—Part 1. Prose 8s. 6d.—Part 2. Poetry, 9s. 6d. bd.

Greek Grammar. By R. Valpy, D.D. With Notes. New edition, improved, 6s. 6d. boards; 7s. 6d. bound.

Greek Exercises: an Introduction to Greek Composition. By the Rev. F. Valpy. 4th edition, 6s. 6d.—KEY, 3s. 6d.

Greek Vocabulary; or, Exercises on the Declinable Parts of Speech. By Dr. Major. 2nd edition, 2s. 6d. bound.

Greek Gradus. By the Rev. J. Brasse, D.D. New edition, improved by Dr. Major. 18s. boards.

Serves as a Lexicon in reading the Greek Tragedians.

London: Longman & Co. by assignment from Mr. Valpy.

Of whom may be had, a Catalogue of Mr. Valpy's Publications.

VALPY'S SCHOOL LATIN CLASSICS.

Horace. Collated from the best Editions, with the Omission of Objectionable Odes and Passages. English Notes, by Dr. Valpy. New edition, 6s. bd.; no Notes, 3s. 6d. bd.

Four Plays of Plautus; with English Notes and a Glossary. By Dr. Valpy. 2nd edition, 4s. 6d. bound.

Terence: The Andrian; with English Notes. Divested of every Indelicacy. By R. Valpy, D.D. 2s. bound.

Virgil: with English Notes, original and selected. By A. J. Valpy, M.A. 10th edition, 7s. 6d. bound.—TEXT only, 18th edition, 3s. 6d. bound.

Phædrus. Burmann's Text, the objectionable Fables omitted; English Notes. By Rev. C. Bradley. 8th edit. 2s. 6d. bd.

Eutropius. English Notes and Questions. By the Rev. C. Bradley. 16th edition, 2s. 6d. bound.

Cornelius Nepos. English Notes and Questions. By the Rev. C. Bradley. 8th edition, 3s. 6d. bound.

Ovidii Metamorphoses Selectæ; English Notes and Questions. By the Rev. C. Bradley. 7th edit. 4s. 6d. bd.

Selections from Ovid's Epistles and Tibullus: English Notes. By Rev. F. Valpy. 2nd edition. 4s. 6d. bd.

Cicero's Select Epistles. English Notes. New edition, 3s. bound; no Notes, 2s. bound.

Juvenal and Persius: with Notes, on the plan of Cicero's Offices and Virgil. By A. J. Valpy. New edition, 5s. 6d. bound; no Notes, 3s. bound.

London: Longman & Co. by Assignment from Mr. Valpy.

Of whom may be had, a Catalogue of Mr. Valpy's Publications.

VALPY'S ELEMENTARY LATIN WORKS.

Latin Grammar: with Notes. By R. Valpy, D.D. New edition, improved, 2s. 6d. bd.

Latin Delectus. By the same. New edition, improved, 2s. 6d. bd.—KEY, 2nd edition, 3s. 6d.

*** This is the only genuine edition.

Second Latin Delectus: English Notes. By the Rev. F. Valpy. 2nd edition, 6s. bound.

Elegantiæ Latinæ. By E. Valpy, B.D. 11th edit. improved, 4s. 6d. bd.—KEY, 2s. 6d. sewed.

Second Latin Exercises. An Introduction to the above. By E. Valpy, B.D. 4th edition, 2s. 6d.

Valpy's First Exercises; to be translated into Latin. New edition, 1s. 6d. bound.

Valpy's Latin Dialogues; selected from the best Writers. 6th edition, 2s. 6d. bound.

Valpy's New Latin Vocabulary: with Tables of Numeral Letters, &c. &c. 10th edition. 2s. bound.

A Series of Exercises and Questions, adapted to the best Latin Grammars. By Rev. C. Bradley. 4th edit. 2s. 6d.

Exercises in Latin Prosody and Versification. By the same. 7th edition, 3s. 6d. bound.—KEY. 2s. 6d. sewed.

London: Longman & Co. by assignment from Mr. Valpy.

Of whom may be had, a Catalogue of Mr. Valpy's Publications.

NEW EDITIONS OF HAMEL'S WORKS.

UNIVERSAL FRENCH GRAMMAR. 4s.

Grammatical Exercises upon the French Language compared with the English. 4s.

Questions on the above; with Key. 9d.

Key to Hamel's French Exercises. 3s.

World in Miniature; an Account of the different Countries of the World; for Translation into French. 4s. 6d.

London: Longman & Co.; and Whittaker & Co.

GREEK PLAYS, ETC.

For the Use of Schools and Colleges.

EURIPIDES: (Five Plays.) The Text of Porson; with Explanatory Remarks; Illustrations from Matthiæ, &c.; and a Synopsis of Metrical Systems. By Dr. MAJOR. 1 vol. post 8vo. 24s. cloth lettered.

Or, Alcestis, Hecuba, Medea, Orestes, Phœnissæ, 5s. each.

2.

SOPHOCLES. The Text of Hermann, Brunck, &c.; with Explanatory English Notes, &c. By Dr. BRASSE, Mr. BURGES, and the Rev. F. VALPY. 2 vols. post 8vo. 34s. cloth lettered.

Separately.—(Œdipus Rex, Œdipus Coloneus, Antigone, Trachiniæ, Philoctetes, Ajax, Electra, each 5s.

3.

ÆSCHYLUS' PROMETHEUS: with English Notes. By G. BURGES, A.M. Trin. Coll. Camb. 2nd edit. post 8vo. 5s. bds.

4.

A GUIDE to the READING of the GREEK TRAGEDIANS. By Dr. MAJOR. 8vo. 7s. 6d. bds.

5.

SEAGER'S ABRIDGMENTS, 2 vols. 8vo. 21. 2s. cloth lettered.

Separately—Viger on Greek Idioms, 9s. 6d.—Hoogeveen on Greek Particles, 7s. 6d.—Bos on Greek Ellipses. 9s. 6d.—Hermann on Greek Metres, 8s. 6d.—Maittaire on Greek Dialects, 9s. 6d.

London: Longman, Brown & Co.

BOOKS ADAPTED FOR SCHOOLS.

OUTLINES of HISTORY, from the Earliest Period to the Abdication of Napoleon. By THOMAS KEIGHTLEY, Esq.

New edition, corrected and considerably improved. 1 vol. fcp. 8vo. with Vignette Titles, price 6s. cloth lettered.

2.

THE CHRONOLOGY of HISTORY; Containing Tables, &c. indispensable for ascertaining the Dates of Historical Events, from the Earliest Periods. By Sir HARRIS NICOLAS, K.C.M.G.

2nd edit. corrected, 1 vol. fcp. 8vo. Vignette Title, 6s. cloth lett.

3.

ARTS, MANUFACTURES, MANNERS, AND INSTITUTIONS of the GREEKS and ROMANS. By the Rev. T. D. FOSBROKE, &c. &c.

2 vols. fcp. 8vo. with Vignette Titles, 12s. cloth lettered.

4.

A TREATISE on GEOMETRY, And its application to the Arts. By Dr. LARDNER. 1 vol. fcp. 8vo. Vignette, and upwards of 200 Figs. 6s. cloth lett.

5.

A TREATISE on ASTRONOMY. By Sir JOHN HERSCHEL.

New edit. 1 vol. fcp. 8vo. with Vignette Title, 6s. cloth lettered.

6.

A TREATISE on ARITHMETIC. By D. LARDNER, L.L.D. F.R.S.

1 vol. fcp. 8vo. with Vignette Title, price 6s. cloth lettered.

London: Longman, Brown & Co.; and John Taylor.

PATENT CARPET.

DANKS, PATENTEE OF THE TRANSVERSELY-COLOURED INGRAIN CARPET.

T. DANKS & SON respectfully invite the Nobility, Gentry, and Public, to inspect this Novel and Elegant Carpet, combining the beauty and effect of the best Brussels at little more than half the expense.—98 and 99, Hatton-garden. Carpet, Bedding, and Floor Cloth Warehouse.

SUPERIOR LOOKING GLASSES and Splendid Gilt PICTURE FRAMES.—CHARLES M'LEAN, 78, Fleet-street, opposite the Dispatch newspaper office, respectfully informs the trade, artists, upholsterers, and the public, that they can be supplied with LOOKING GLASSES and PICTURE FRAMES, of the very best manufacture, at prices never hitherto attempted.—May be had gratis, and sent free of post to any part of the kingdom, LARGE SHEETS OF DRAWINGS, representing the exact patterns and prices of 100 different sized picture frames and 120 looking glasses, elegantly ornamented with designs made expressly for this manufactory. The trade supplied with frames in the compo. Fancy wood frames and mouldings, and room borderings. Old frames repaired and regilt. Glasses resilvered. 30,000 frames kept seasoned for immediate delivery.—*All goods not approved of in three months taken back, and money returned.*

BUTLER'S TASTELESS SEIDLITZ POWDER.—All the solid ingredients of the Seidlitz Spring which are usually offered to the public in two separate portions, are here, by a process which prevents any spontaneous action upon each other, combined in one compound powder,—the effervescing solution of which in water is nearly *tasteless*. Being inclosed in a bottle, it will, when kept securely corked, remain uninjured by humidity during the longest sea voyage or land journey. The solution, besides being more palateable, is made in much less time, and with infinitely less trouble than that produced with the two powders prepared in the usual way.—Sold in 2s. 6d. bottles, (which are inclosed in a case, and accompanied by a measure and spoon,) by the preparer, Thomas Butler, Chemist, 4, Cheapside—and J. Sanger, 150, Oxford-street—London; may be obtained also of Davenport & Stedman, 26, Watloo-place, Edinburgh; or, by order, through any Druggist or Medical Establishment.—*** No. 4, Cheapside, corner of St. Paul's. If procured elsewhere, be careful to order "*Butler's*" Tasteless Seidlitz Powder, and to observe the address.

PENNY POSTAGE ADVANTAGEOUS TO CHILDREN CUTTING THEIR TEETH.—STEEDMAN'S SOOTHING POWDERS.—The good effects of these Powders in preserving a healthy state of the constitution during teething, have now had twenty years' experience, (the Proprietor first gave them to his own children with great benefit,) during which time thousands of children have been relieved annually from all those distressing symptoms which children suffer while cutting teeth, viz. feverish heats, fits, convulsions, sickness of stomach, and debility, accompanied with relaxation of the bowels, and inflammation of the gums.—Prepared, and sold in packets, at 1s. 1½d. by J. Steedman, Chemist, Walworth, Surrey; and sold by all Chemists and Medicine Venders in the United Kingdom. Any lady wishing to try them, by inclosing a shilling in a letter to the proprietor, will receive a packet by return of post, free of expense.

CRADOCK & CO. (LATE BALDWIN & CRADOCK),

48, PATERNOSTER-ROW, LONDON.

Valuable SCHOOL BOOKS just published.

In a handsome 12mo. volume, price 4s. 6d. roan lettered.

1. BENTLEY'S BRITISH CLASS-BOOK; or, Exercises in Reading and Elocution, selected almost entirely from the Works of Modern Authors, in Prose and Verse, and designed for the Use of Schools and Families. By the Rev. HUGH BENTLEY.

*** A List of the Contents of this Original School Reader may be had on application to the Publishers.

2. QUÆSTIONES VIRGILIANÆ; or, Notes and Questions on the First Six and the Ninth Books of Æneid, adapted to the Middle Forms in Schools. By J. Edwards, A.M. Trinity College, Cambridge, Second Master of King's College School, London. In fcap. 8vo. 3s. bound, or bound with the Æneid, 6s.

*** The Quæstiones are prepared partly to give the young pupil such help as may not ordinarily be within his reach, and partly to introduce him to the habit of carefulness and accuracy in the preparation of his lessons. They will be found useful also to the self-taught student.

3. P. VIRGILII MARONIS ÆNEIS in usum studiosæ Juventutis accurate recensuit J. Edwards, A.M. Coll. S. S. Trin. Cantab. Collegii Regal. Londin. Hypodidasculus. In fcap. 8vo. 3s. 6d. bound, or with the Quæstiones, 6s.

4. GERMAN EXERCISES, with a Grammatical Introduction; being a Guide to German Writing. By Francis Stromeyer, Ph. D. Professor of German Literature at the College of Civil Engineers. In a 12mo. volume, 2s. 6d. cloth.

JOSEPH GUY'S popular SCHOOL BOOKS.

READING AND SPELLING.

1. GUY'S NEW BRITISH READER; or, a Sequel to his British Spelling Book: containing a great variety of Easy Lessons, selected from approved authors, exhibiting a very easy gradation, and adapted to the Junior Classes of Ladies' and Gentlemen's Schools. In 12mo. the 9th edition, illustrated with Engravings, price 3s. 6d. bd. in roan and lettered.

2. GUY'S ELEMENTS of ANCIENT HISTORY, including Greece, Egypt, Persia, Carthage, Rome, the Philistines, Phœnicians, Jews, Goths, Huns, &c. New edition, in 12mo. containing upwards of 300 pages, price only 3s. 6d. bd. in roan and lettered.

3. GUY'S ELEMENTS of MODERN HISTORY, including France, Germany, Spain, Portugal, Poland, Russia, Prussia, Sweden, Denmark, Italy, America, &c. 12mo. a new edition, corrected and enlarged, price only 3s. 6d. bound and lettered.

4. GUY'S ELEMENTS of BRITISH HISTORY, containing England, Scotland, Wales, and Ireland, under separate heads. 12mo. price 3s. 6d. bound and lettered.

*** In the above three works the Chapters are divided into Sections, and numbered to correspond with a copious list of Questions for Examination at the end of each volume. The object of these works is to concentrate a sufficient portion of General History from the best authorities, in three moderate school volumes.

5. GUY'S GENERAL SCHOOL QUESTION BOOK in Ancient and Modern History, Biography, Geography, Astronomy, and Miscellaneous Literature. 6th edition, with a Frontispiece Chart of History, in a thick volume 12mo. price 4s. 6d. roan lettered.

6. GUY'S NEW BRITISH PRIMER; or, Reading Made Easy for Children of an Early Age, in Five Parts, intended as an Introduction to his 'New British Spelling Book,' &c. In 18mo. the 20th edition, with Cuts, price only 6d. strongly half-bound.

7. GUY'S BRITISH SPELLING BOOK; or, an Easy Introduction to Spelling and Reading, in 7 Parts, containing a great variety of Easy Lessons, exactly adapted to the capacities of youth; and arranged in a new, easy, and pleasing order. The 58th edition, in 12mo. with numerous Engravings, price 1s. 6d. bound.

8. GUY'S NEW BRITISH EXPOSITOR: a Sequel to the British Spelling Book. The 9th edition, enlarged, 1s. 6d. bound.

9. GUY'S FIRST ENGLISH GRAMMAR, for the Use of the Junior Classes in Schools, and for Private Families. In which the Rules are accompanied by a Series of Examples and Exercises, to accustom the Learner to blend practice with theory. 18mo. price 1s. strongly bound, or in coloured paper, price 9d.

10. GUY'S FIRST ENGLISH EXERCISES in Parsing, Orthography, Syntax, and Punctuation, to supply the Junior Classes in Ladies' and Gentlemen's Schools, and Private Families, with Rules and Examples for perspicuous and accurate Writing, on the plan of Lindley Murray, and adapted to his Key. 18mo. price 1s. bound, or in coloured paper, 9d.

11. GUY'S PARENT'S FIRST QUESTION BOOK; or, Mother's Catechism of Useful Knowledge, for Children of an Early Age. Illustrated by useful Engravings, in a neat square volume, printed in a bold type, price 1s. strongly bound, or in coloured paper, price 9d.

ARITHMETIC.

12. GUY'S TUTOR'S ASSISTANT; or Complete Scholar's Arithmetic; on a plan materially to aid the comprehension and accelerate the progress of the Learner, as well as to facilitate and greatly abridge the labour of the Teacher, not only by a very careful gradation throughout the Series of Examples, and a choice and widely-varied selection, but also by having the First Question of every Series in each Rule worked at length. The 14th edition, 12mo. carefully corrected and stereotyped, price 2s. bound.

13. A KEY to the Above, containing the Solutions of the Questions given much at length, and in the correct School-form of working. New edition, 12mo. price 4s. 6d. bound in blue and lettered.

GUY'S SCHOOL BOOKS, continued.

14. GUY'S FIRST ARITHMETIC, in handsome script type on fine writing paper. Large 8vo. price 1s. 3d. half-bound.—A KEY, 3d.

*** As answering the twofold purpose of an Arithmetic and Ciphering Book, this is the cheapest school book ever published. To Ladies' Academies it must be a useful acquisition, and to large Schools where economy is a leading object, it will be particularly acceptable.

15. GUY'S COMPLETE TREATISE of BOOK-KEEPING by SINGLE ENTRY, for Ladies' and Gentlemen's Schools. Price 1s. half-bound.

*** A cheap compendium of Book-keeping has long been wanting for Schools, particularly for Ladies' Academies. The subject is too much neglected in education, though no branch of knowledge is more required on leaving School.

16. GUY'S SCHOOL CIPHERING BOOK; containing all the variety of Questions usually proposed in the first Four Rules of Arithmetic, simple and compound; with a Complete Set of Arithmetical Tables. Fine post writing paper, 4to. 9th edition, price 3s. 6d. half-bd.—A KEY to the same, 6d.

WORKS ON GEOGRAPHY AND ASTRONOMY.

17. GUY'S SCHOOL GEOGRAPHY, on a new and easy plan. To which are added, a Treatise on the Globes, a copious List of Questions for Examination, and a Dictionary of Names of Places, &c., with their true accentuation and explanation. Illustrated with 7 Maps. The 15th edition, enlarged and thoroughly revised. Royal 18mo. price 3s. bd. in red.

18. A GEOGRAPHICAL KEY, price 1s. 6d.

19. GUY'S FIRST GEOGRAPHY for the Junior Classes, an Introduction to the Above, with 6 Maps, and Questions for Examination at the bottom of each page, price 1s. half-bound, or in coloured paper, as Pinnock's Catechisms, 9d.

*** This work is a suitable introduction to the 'School Geography,' and is expressly adapted to precede it. In the preface an experienced Teacher has suggested the most easy and expeditious method of communicating the knowledge of this science to the uninstructed mind.

20. GUY'S SCHOOL ATLAS of MODERN GEOGRAPHY, in Sixteen Royal 4to. Maps, handsomely coloured, adapted for the use of the junior classes in Ladies' and Gentlemen's Schools, and to save the expense, in the Child's first course of Geography, of more costly Maps. Done up in 4to. or in 8vo. Price only 5s. half-bound.

21. GUY'S ELEMENTS of ASTRONOMY, familiarly explaining the general Phenomena of the Heavenly bodies, and the Theory of the Tides. Illustrated with 18 fine Plates. To which is subjoined, a Complete Set of Questions for Examination. The whole adapted as well to the use of Private Students as Public Seminaries. The 5th edition, in royal 18mo. price 5s. bound in purple and lettered.

A USEFUL ADDITION TO THE SCHOOL LIBRARY.

22. GUY'S CHART of GENERAL HISTORY and BIOGRAPHY, ANCIENT and MODERN, from the latest and best authorities. On a large sheet of Columbier Drawing Paper, and coloured for easy reference. The 5th edition, price 7s.; or mounted on Canvas and Roller, 10s. 6d.

*** A chart of this kind is to history what maps are to geography; it will greatly facilitate the student's progress, and give him clearer ideas of the rise, duration, and fall of each kingdom and empire, than the bare perusal of many volumes. For a work of reference, in the Library or School-room, it is extremely useful.

☞ *Messrs. Cradock & Co. beg to apprise the Heads of Schools that they are the only Publishers of Joseph Guy's Popular School Books; any work bearing a name somewhat similar, and not published by them, cannot be this celebrated Author's production, but some unworthy imitation, to impose upon Teachers.*

SUPERIOR ATLASES.

1. RUSSELL'S GENERAL ATLAS of MODERN GEOGRAPHY, Twenty-five 4to. Maps, with a Consulting Index. By J. C. RUSSELL, Geographer. Royal 8vo. price 10s. half-bound; or with the outlines coloured, 12s.

2. RUSSELL'S ATLAS of ANCIENT GEOGRAPHY. Containing 29 4to. Maps, and 7 Plans of Ancient Cities, with an Index. Royal 8vo. price 10s. half-bound; or coloured, price 12s.

3. RUSSELL'S ATLAS of ANCIENT and MODERN GEOGRAPHY COMBINED. Forty-seven Maps, Royal 4to., with Consulting Indexes, coloured, price only 1l. 4s. half-bound.

*** The above valuable Atlas contains Twenty-five Modern Maps, and Twenty-two Ancient, with an Index of all the names on each map, whether town, river, mountain, lake, &c., their latitude, longitude, and reference to the map on which each is to be found. A striking excellence in this Atlas, also, is, that the Maps contain every name of historical, commercial, and political consequence, without being encumbered with those of less importance such as seldom occur in reading, and when there, only crowd the maps, and render them less clear for useful and hasty reference.

4. OSTELL'S NEW GENERAL ATLAS, 30 Maps, from the latest and best authorities; including Maps of Judæa, Ancient Greece, and the Roman Empire. Corrected to the present time. With a Consulting Index. Royal 4to. price 14s. half-bound; or coloured outlines, 18s.; and with the Maps full coloured, price 21s.

5. PALMER'S BIBLE ATLAS; or, Sacred Geography Delineated. In 26 Maps. Large 8vo. coloured, with a copious Index, price 12s. half-bound morocco, or uncoloured, price 9s. half-bound.

6. MAPS and TABLES of CHRONOLOGY and GENEALOGY. For the Use of Harrow School. By Dr. Longley, Bishop of Ripon. Illustrated by 7 coloured Maps, viz. Europe under the Western Empire.—Europe late in the Fifth Century.—Europe under the Empire of Charlemagne.—Europe after the division of the Empire of Charlemagne, towards the close of the Ninth Century.—Europe about the year 1074.—Europe in 1300.—Europe in the year 1453. In 4to. price 8s. 6d. half-bound.

Tate's Horace.

HORATIUS RESTITUTUS; or, the Books of Horace, arranged in Chronological Order, according to the scheme of Dr. Bentley, from the Text of Gesner; corrected and improved, with a Preliminary Dissertation, very much enlarged, on the Chronology of the Works, on the Localities, and on the Life and Character of the Poet. By JAMES TATE, M.A., late Master of Richmond Grammar School, and Canon Residentiary of St. Paul's. The 2nd edition, 8vo. price 12s. cl. To this edition is added an original Treatise on the Metres of Horace.

Frey's Hebrew and English Grammar.

A HEBREW GRAMMAR in the English Language. By the Rev. JOS. SAMUEL C. F. FREY, Editor of Vanderhooght's Hebrew Bible; Author of a Hebrew, Latin, and English Dictionary. The 10th edition, carefully revised and greatly enlarged by the addition of Reading Lessons, Rules, and Analyses, both from Genesis and the Book of Psalms, by the Author, stereotyped and printed by C. Whittingham, in a handsome 8vo. volume, price 8s. 6d. cloth extra.

*** This valuable work has rendered the Hebrew tongue less difficult of attainment than any other language, ancient or modern.

Popular, Cheap, and Useful Publications.

1. DOMESTIC BREWING, and British Wine-making; a Handbook for Families. Price 6d.

2. PRESERVING, PICKLING, Confectionery, Pastry, and Bread-making. Price 6d.

3. ENGLISH COOKERY, with Practical Directions for dressing Family Dinners. Price 6d.

4. THE HOUSEKEEPER'S MANUAL; or, Practical Directions in English Cookery, Preserving, Pickling, Confectionery, Pastry, Cakes, Jellies, and Bread-making; Domestic Brewing, and British Wine-making of every description. In fcap. 8vo. price 2s. cloth.

5. THE MOTHER'S MEDICAL ADVISER on the Diseases and Management of Children, with Recipes, 6d.

6. THE CARE of DOMESTIC ANIMALS; viz. Milch Cows, Pigs, Poultry, Ducks, Turkeys, Pigeons, Rabbits, &c. Price 6d.

7. THE FLOWER GARDENER'S MANUAL. Price 6d.

8. THE KITCHEN GARDENER'S MANUAL. Price 6d.

9. THE FRUIT GARDENER'S MANUAL and GREEN-HOUSE COMPANION. Price 6d.

10. THE GARDENER'S MANUAL; or, Practical Instructions for the Cultivation and Management of the Flower, the Fruit, and the Kitchen Garden; the Hot-house, Green-house, and Conservatory. Fcap. 8vo. price 2s. cloth.

11. THE CHRISTIAN RELIGION: an Account of every Sect, its Origin, Progress, Tenets of Belief, and Rites and Ceremonies, from the best Authorities. Price 6d.

12. AUSTRALIA, VAN DIEMEN'S LAND, and NEW ZEALAND, with a Map. Price 6d.

13. THE HORSE: its Habits, Diseases, and Mode of Treatment, with Advice to Purchasers. Price 6d.

14. THE STEAM-ENGINE FAMILIARLY DESCRIBED, with a brief Account of its History and Uses. Illustrated with Cuts. Price 6d.

15. AN OUTLINE of GEOLOGY; being a clear and concise Introduction to a Knowledge of the Principal Facts in that interesting and popular Science. Price 6d.

16. THE PHYSIOLOGY of HEALTH; being an Account of the more important Functions of the Human Body, with a few Hints as to their Management. Price 6d.

The Newest Work on Farm Management.

Lately published, in a thick 8vo. vol. of nearly 700 pages, illustrated with numerous Cuts and Plates, the 7th edition, revised, enlarged, and greatly improved, by a Member of the English Agricultural Society, price 17s. cloth.

THE COMPLETE GRAZIER; or, Farmer's and Cattle Breeder's, and Dealer's Assistant.

Comprising everything useful to the FARMER, the COUNTRY GENTLEMAN, the LAND STEWARD, and all interested in the management of LAND, HORSES, CATTLE, SHEEP, SWINE, POULTRY, &c., being a 'COMPLETE BODY of BRITISH HUSBANDRY,' in its present improved practice.

Greece, Syria, Egypt, India.

In a thick volume, small 8vo. price 9s. cloth extra,

A NEW GUIDE to the LEVANT, for the Use of Travellers in Greece, Egypt, Syria, and Asia Minor, together with Tables of all the Mediterranean Steamers, and descriptions of the places at which they touch, including Lisbon, Cadiz, Gibraltar, Malaga, Malta, the Ionian Islands, Syria, and Constantinople; also comprising full particulars of the Overland Journey to India, the Voyage from Suez to Bombay, and the Systems of Dawk Travelling in the Three Presidencies. By T. H. USBORNE, Esq.

The Mourner's Consolation.

Lately published, in fcap. 8vo. price 5s. cloth extra,

HOURS of SADNESS; or, Instruction and Comfort for the Mourner.

Oh, let the accent of each word make known,
We mix the tears of Sion with our own.—*Quarles.*

"The heart-stricken mourner will assuredly find in it all that can soften, and sanctify, and bless his sorrow."—*Wolverhampton Chronicle.*

London: JAMES HOLMES, 4, Took's Court, Chancery Lane. Published every Saturday, at the ATHENÆUM OFFICE, 14, Wellington-street North, Strand, by JOHN FRANCIS; and sold by all Booksellers and Newsvenders.—Agents: for SCOTLAND, Messrs. Bell & Bradfute, Edinburgh:—for IRELAND, J. Cumming, Dublin.